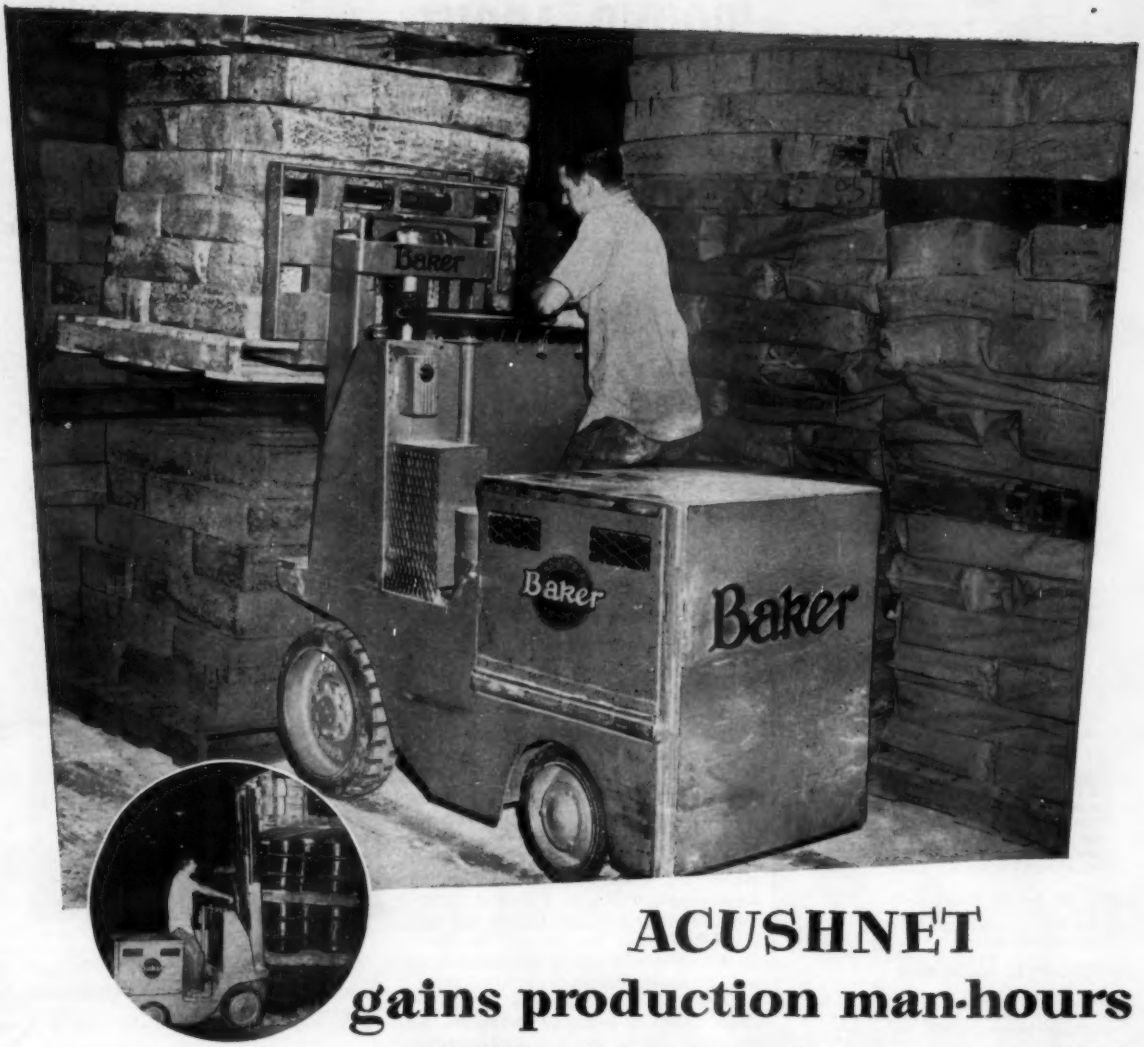

ACUSHNET gains production man-hours while decreasing payroll!

O Acushnet Process Company of New Bedford, Massachusetts, manufacturers of the well-known "Titleist" Golf Ball and supplier of precision-molded rubber parts to all of industry, has increased the productive efficiency of its labor force by mechanized handling with fork lift trucks thus eliminating backbreaking manual handling.

Last year the company purchased a Baker 4,000 pound fork truck for its receiving department. The truck's ability to enter a trailer and handle material on pallets was one of the factors in cutting freight handling costs in half. Time for unloading a typical 30,000 pound highway truck load of raw materials was reduced from 4 to 1¼ hours. The dependability of the Baker battery-powered truck, with practically no down-time and very little maintenance was another decided improvement over the gas fork truck formerly on this job. Additional advantages are quietness of operation and greater speed in handling and maneuvering.

Acushnet handles each month about a million pounds of raw materials such as baled crude rubber, synthetic rubber blocks, and drum-loads of raw ingredients. All are now handled on pallets with fork trucks.

Write for your free copy of the "Baker Handling Library", a portfolio of case histories showing actual cost savings in a wide variety of plants. The Baker Raulang Company, 1251 West 80th St., Cleveland 2, Ohio.

Baker.
industrial trucks

For more facts circle 502 on Reply Card

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'ROUND ABOUT with the editors in field and office

Edited by R. L. Marinello

Plant Engineer is Promoted

C. P. Lavelle was recently appointed division manager of the Hygrade Metal Finishing Division of the United States Hoffman Machinery Corp., New York, N. Y.

He was formerly plant engineer for the Sikorsky Helicopter Division of United Aircraft Corp., Bridgeport, Conn., and before that he was associated with Kaiser Metal Products of Bristol, Pa., and Chance-Vought Aircraft of Dallas, Texas.

Overhead Crane Conference

DISCUSSION OF cranes as to when to operate them on a-c or d-c and why, plus a session on grab bucket cranes and crane collector systems will be presented at the two-day conference at the Cleveland Hotel, Cleveland, Ohio, on March 28 and 29. The Materials Handling sub-committee is planning this technical conference on electrical overhead cranes.

Monday's session on overhead traveling cranes will discuss: Industry Application Requirements; When A-C and Why; When D-C and Why; and When Adjustable Voltage and Why. The afternoon session will consist of several talks on grab bucket cranes.

Tuesday morning's session will be on crane collector systems. Points to be discussed will be the Safety Aspects of Sliding Conductor Systems, Automatic Take-Up Reels, Power Supply, Taps, Size and Spacing of Conductors; and Maintenance, Cleaning and De-icing of Collector Systems. Tuesday afternoon the group will take in an inspection trip through the engine plant of the Ford Motor Company.

If you would like additional information on this meeting, contact S. S. Siegel, The Clark Controller Co., 1146 East 152nd St., Cleveland 10, Ohio.

It's Now Plant Engineer Bell

Sanford R. Bell has been promoted to the position of plant engineer at International Minerals and Chemical Corporation's Bonnie chemical plant, located near Bartow, Florida.

Mr. Bell joined International's Phosphate Chemicals Division last April as project engineer, replacing Robert V. Safford, who was recently moved up to assistant manager in charge of engineering at the Bonnie Plant. Before joining the company, he was a process engineer with the Blaw Knox Engineering firm of Pittsburgh, Pa.

Engineer Changes at Seiberling

E. G. Balzano, plant engineer at Seiberling Rubber Co., has been named chief engineer of Productos de Caucho Villegas, South America, the company's South American affiliate in Colombia.

Maxwell Cole, chief power engineer, has been promoted to plant engineer, suceeding Balzano at the company's Akron plant.

Balzano joined Seiberling in 1948 after 14 years' service with Firestone Tire & Rubber Co. He was a master mechanic in the Seiberling engineering division before being named plant engineer in 1949.

Cole joined the company in 1949

Balzano

Cole

after being associated with Parker Appliance Co. and the Aluminum Company of America.

Service for Los Angeles Area

MORE THAN thirty leading manufacturers in Los Angeles are finding that mutual cooperation can pay big dividends to themselves and to the community.

Banded together in a non-profit, cooperative trade group called Industrial Manufacturing Services Corp., the members act as a cooperative unit in pooling technical know-how, applying the principles of product and procurement research in a practical way and sharing ideas and experiences. IMSCO also acts as a clearing house for inventions and products, and aids industry in solving problems involving products, manufacturing and procurement.

Organized two years ago, the purpose of this group is to bring about greater cooperation between suppliers and local industrial firms. Executive committees composed of specialists in every branch of industry, including purchasing, manufacturing, research, electronics, etc., han-

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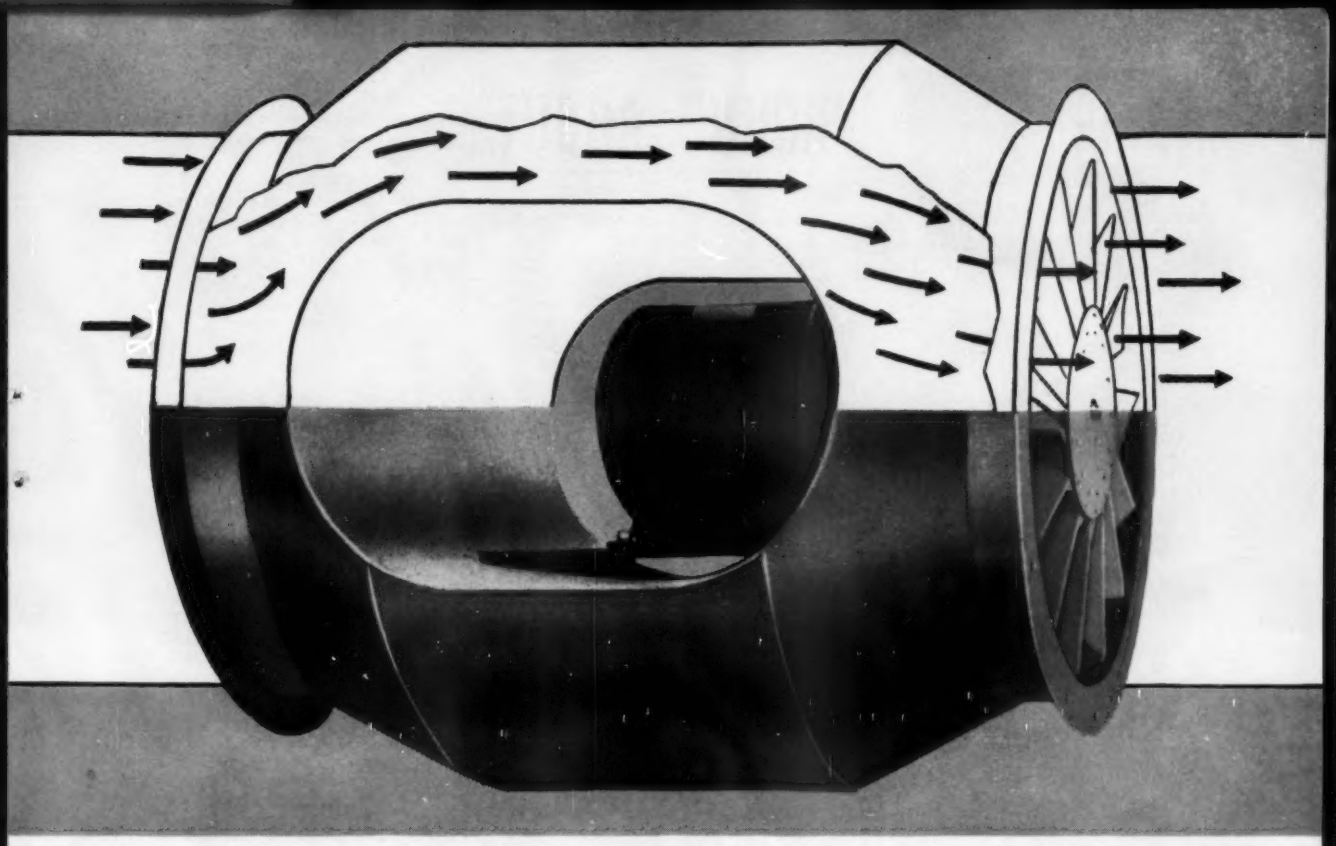
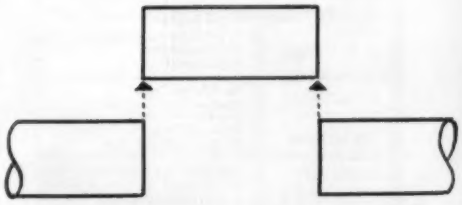


Bifurcator® Fan installs right in duct . . . to exhaust hot, corrosive, flammable, fumes

Solve that fume problem the modern way — with an easy-to-install Bifurcator Fan. This fan unit fits right into your duct system, just like a flanged section of ductwork. It requires no expensive platforms . . . no supports. And you needn't change the direction of air flow. A Bifurcator can be installed horizontally, vertically or at any angle. It's compact and neat in appearance . . . hardly any wider than the duct.

The Bifurcator is an axial-flow fan in a divided housing. Fumes bypass the motor which stays cool, clean and easy to inspect or maintain. Bifurcators can be constructed of cold rolled steel, stainless steel, rubber covered steel, monel metal, and many other corrosion-resistant materials. They can also be coated with Heresite, Ucilon, Tamanite, Herecrol R-9 sprayed synthetic rubber and other coatings. Bifurcators are available with fan wheels from 12″ to 48″ in diameter, with exhaust capacities up to 45,000 CFM. Send now for free catalog.



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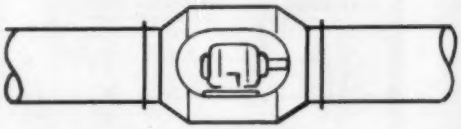

2. BIFURCATOR GOES IN

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A DIVISION OF

American Machine and Metals, Inc.

EAST MOLINE, ILLINOIS

MAIL COUPON TODAY!

DeBOTHEZAT FANS, Dept. PE-355,
Division of American Machine and Metals, Inc.
East Moline, Illinois

Send me free Catalog DB-4-53 on Bifurcators for exhausting hot, corrosive, flammable and explosive fumes.

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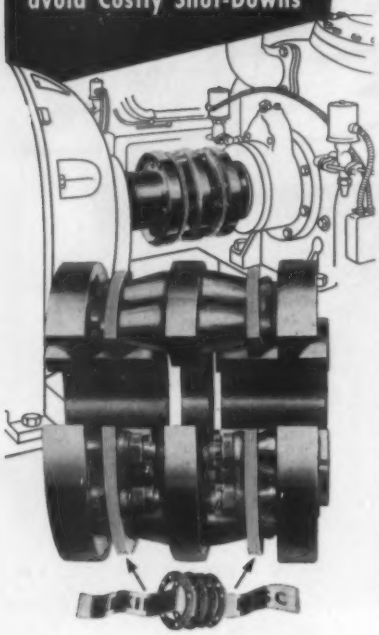
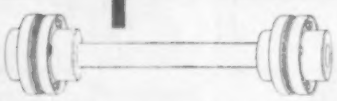
Specify THOMAS ALL METAL
FLEXIBLE COUPLINGS
for Power Transmission to avoid Costly Shut-Downs

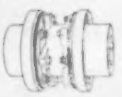


Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES

FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.





Thomas Couplings are made for a wide range of speeds, horsepower, shaft sizes and can be assembled or disassembled without disturbing the connected machines, except in rare instances.

Write for new Engineering Catalog No. 51A

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA, U.S.A.

For more facts circle 504 on Reply Card

'ROUND ABOUT

dle manufacturers' requests for possible solutions of their problems.

Anyone interested in receiving more information about this industrial service may direct their inquiry to Arthur W. Vienna, president, California Spring Co., Inc., Los Angeles 15, California, who is chairman of the executive board.

Mobeco Elects New President

Albert A. Fava was elected president and appointed general manager for the Mobeco, Inc., Watertown, Mass.

He has had a varied experience in engineering, having been associated with The New England Power Co., General Foods Corp. and the Lumsden & Var. Stone Co.

Mr. Fava is also serving as president of The Engineering Societies of New England and is a former president of the Plant Engineers' Club of Boston. He has long been associated with the activities of engineering societies in Greater Boston and is well known in engineering fields.

Two MH Engineers Wanted

1. A man for a flour mill concern in the midwest with an industrial or mechanical engineering degree who has had four to five years' experience in materials handling. This materials handling experience should have been with a concern having large production volume and where practically all the finished products are palletized and handled by fork lifts. Salary range will be between $5000 and $7500; however, specific salary will depend to large extent upon applicant's contribution to the company.

2. A man who is familiar with materials handling from the raw material stage on through the processing and final shipping and storing and would like to locate in the Appalachian area with a chemical firm. He should be thoroughly familiar with all types of materials handling, including radar controlled materials handling methods. Some knowledge of chemistry or chemical terms would be helpful.

Any readers interested in either of these positions should send a resume of their past experience to The Editor, Plant Engineering, 110 So. Dearborn St., Chicago 3, Illinois, and this information will be passed on to the appropriate party.

Lost: One Decimal Point

IN THE ARTICLE "Sprayed Foam Insulation" appearing on page 99 of our February, 1955, issue, the K factor for the insulation was given as "24." This was in error as many engineers who read the article may have realized. It should have read ".24."

The editor who handled this article is on an extensive search to see what happened to the elusive decimal point.

Automation Goes to School

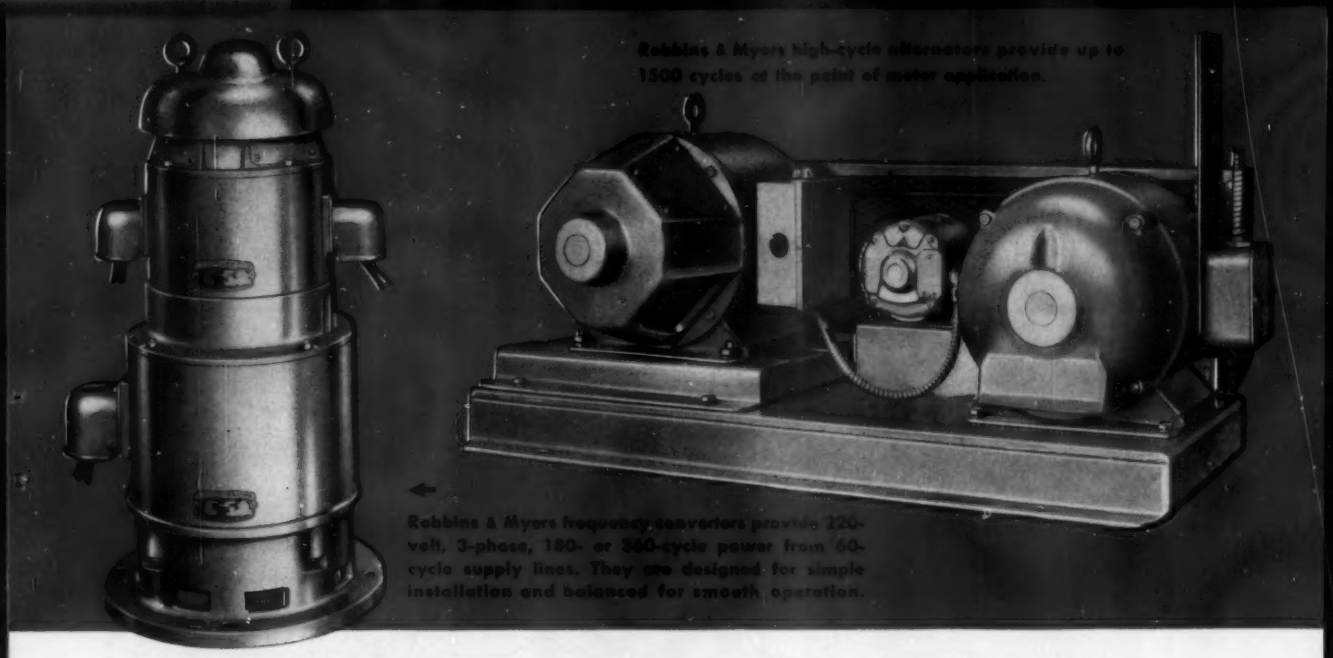
AS A PART of the Centennial celebration of the College of Engineering, Michigan State College is sponsoring a symposium on "Automation—Engineering for Tomorrow," to be held on May 13.

The general sessions will cover such subjects as: Automation to Date; Bases for Design of Automated System; Automation as an Engineer Sees It; and Mechanical Design of Equipment.

Readers interested in attending this symposium should write to P. J. Thorson, Assistant Professor of Mechanical Engineering, Michigan State College, East Lansing, Michigan.

FOA Team of Maintenance Foremen Visits U.S. Industries

Ten construction and maintenance foremen from Iceland touring the United States under our government's Foreign Operations Administration plan, made one of their plant stops at the Plainfield Works of the Worthington Corp.


Robbins & Myers high-cycle alternators provide up to 1500 cycles at the point of motor application.
Robbins & Myers frequency converters provide 220-volt, 3-phase, 180- or 360-cycle power from 60-cycle supply lines. They are designed for simple installation and balanced for smooth operation.

R & M frequency converters and alternators provide economical sources of high-cycle power

The applications for high-cycle motors are mounting with increased demand for high-speed routers, planers, grinders, etc., in both the wood and metal working industries. Also in portable tool design, the high-cycle motor is proving most applicable where small size, light weight and minimum maintenance are paramount.

Robbins & Myers frequency converters and alternators are convenient, economical sources of high-cycle power. They can be installed at the point of use.

R & M Frequency Converters

R & M frequency converters convert 60-cycle A.C. to 220-volt, 3-phase, 180- or 360-cycle. These units are low in cost, high in efficiency, require negligible maintenance. They need no exciter or auxiliary equipment other than a motor starter.

They are designed to meet unusual overload conditions. Voltage change from no-load to full-load does not exceed 8% for 180-cycle converters, and 15% for 360-cycle converters.

R & M Alternators

R & M alternators are high-frequency generators that provide high-frequency current within each of a number of ranges, up to 1500 cycles—beyond the range of converters. They are available from 7.5 kva, 360-500 cycles, to 2 kva, 1000-1500 cycles.

Polyphase driving motor and alternator are both in the rugged R & M "All-Weather" design, which keeps out moisture. Separate exciter unit provides direct current to the alternator field circuit. Rheostat in the exciter field circuit permits control of the alternator voltage. Pulleys may be changed to provide the frequency desired by the user, within the range of each unit.

R & M Motors to 125 HP

In addition, if you need a motor, whether standard or custom-designed . . . motors with special housing designs or motor parts to fit your housings . . . fractionals from 1/200th HP up—integrals to 125 HP . . . write us today. Our motor specialists do a scientific job of matching the motor to the product or application. We can make a real contribution to the solution of your problem.

R & M makes both!

Fractional-horsepower motors and parts . . . from 1/200 HP.

Integral-horsepower motors; famous R & M "All-Weather"* with sealed bearings. Up to 125 HP.

If it's an R & M, it's the Right Motor!

*"All-Weather" is an R & M trademark.

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MOTOR DIVISION: SPRINGFIELD 99, OHIO—BRANTFORD, ONTARIO

Fractional & Integral HP Motors & Generators | Moyno Pumps | Propellair Industrial Ventilating Equipment | Electric Fans | Electric & Hand Hoists & Cranes

Robbins & Myers, Inc., Motor Division, Springfield 99, Ohio PE

Please send me, without obligation, information on:

- ☐ Frequency Converters and High-Frequency Alternators.
- ☐ Motor Parts for Portable Tools.
- ☐ R & M "All-Weather" Motors up to 125 HP.
- ☐ Please have a Motor Specialist call.

Product we manufacture: _____

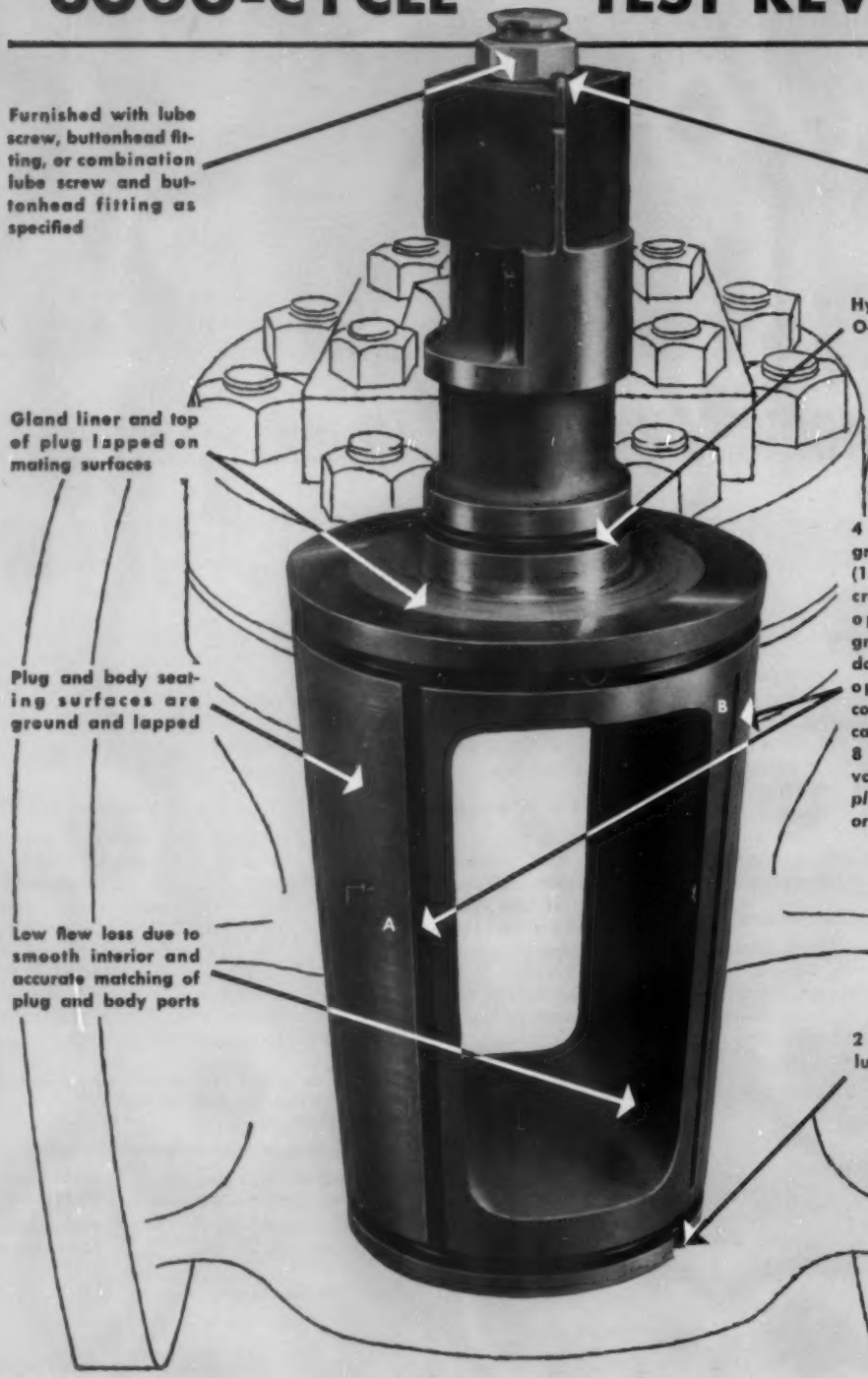
Name _____ *Title* _____

Company _____

Street _____

City _____ *State* _____

3000-CYCLE TEST REVEALS


Furnished with lube screw, buttonhead fitting, or combination lube screw and buttonhead fitting as specified
Position indicator
Hydrocarbon-resistant O-ring
Gland liner and top of plug lapped on mating surfaces
4 vertical lubricant grooves (A) 2 grooves (180° apart) do not cross body ports in operation. (B) 2 grooves (180° apart) do cross body ports in operation, but are connected with lubrication supply through 8 jump grooves in valve body only when plug is in fully opened or closed position.
Plug and body seating surfaces are ground and lapped
B
A
Low flow loss due to smooth interior and accurate matching of plug and body ports
2 grooves supply lubricant to reservoir

WHY NEW OIC DESIGN EXTENDS PLUG VALVE LIFE

TEST: This 150-lb. steel valve cycle tested with solvent, 3000 full openings and closings at 425 p.s.i.

RESULT: Pressure tight . . . still operable at low torque . . . no sign of galling or seizing.

Gland assembly: Resilient packing completely isolated from rotating parts. Requires little adjustment and assures longest possible packing life.

The gland liner is OIC "Alloy 40", an aluminum-silicon-bronze having a melting point in excess of 1750 F. It has low friction bearing characteristics, will not seize or gall and affords an additional pressure seal between the plug and itself.

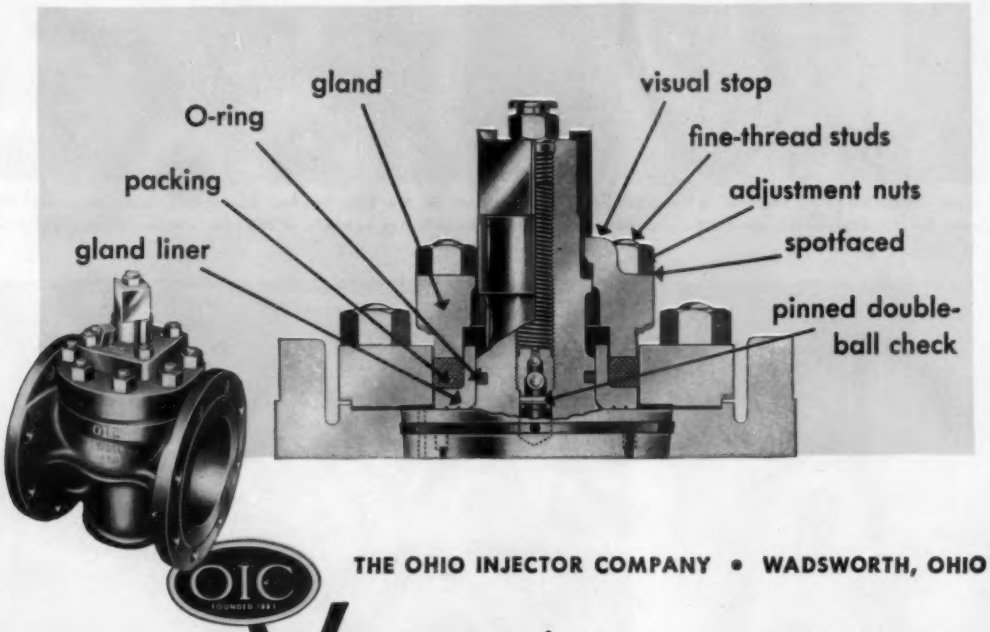
Precision gland adjustment: Fine-thread studs with semifinished, washer-faced nuts on spotfaced bearing surfaces afford accurate plug adjustment.

Position indicator on top of plug shank and *visual stop* on gland show position of plug at a glance.

Pinned double-ball check at bottom of plug shank eliminates blow-outs when lube screw or lube fitting is removed and precludes loss of balls into lubrication system under high-pressure gun lubrication.

Write today . . . request Form No. 1003, which will give you complete valve details, including specifications.

Order from your OIC Distributor



THE OHIO INJECTOR COMPANY • WADSWORTH, OHIO

VALVES | FORGED & CAST STEEL, IRON & BRONZE, LUBRICATED PLUG VALVES

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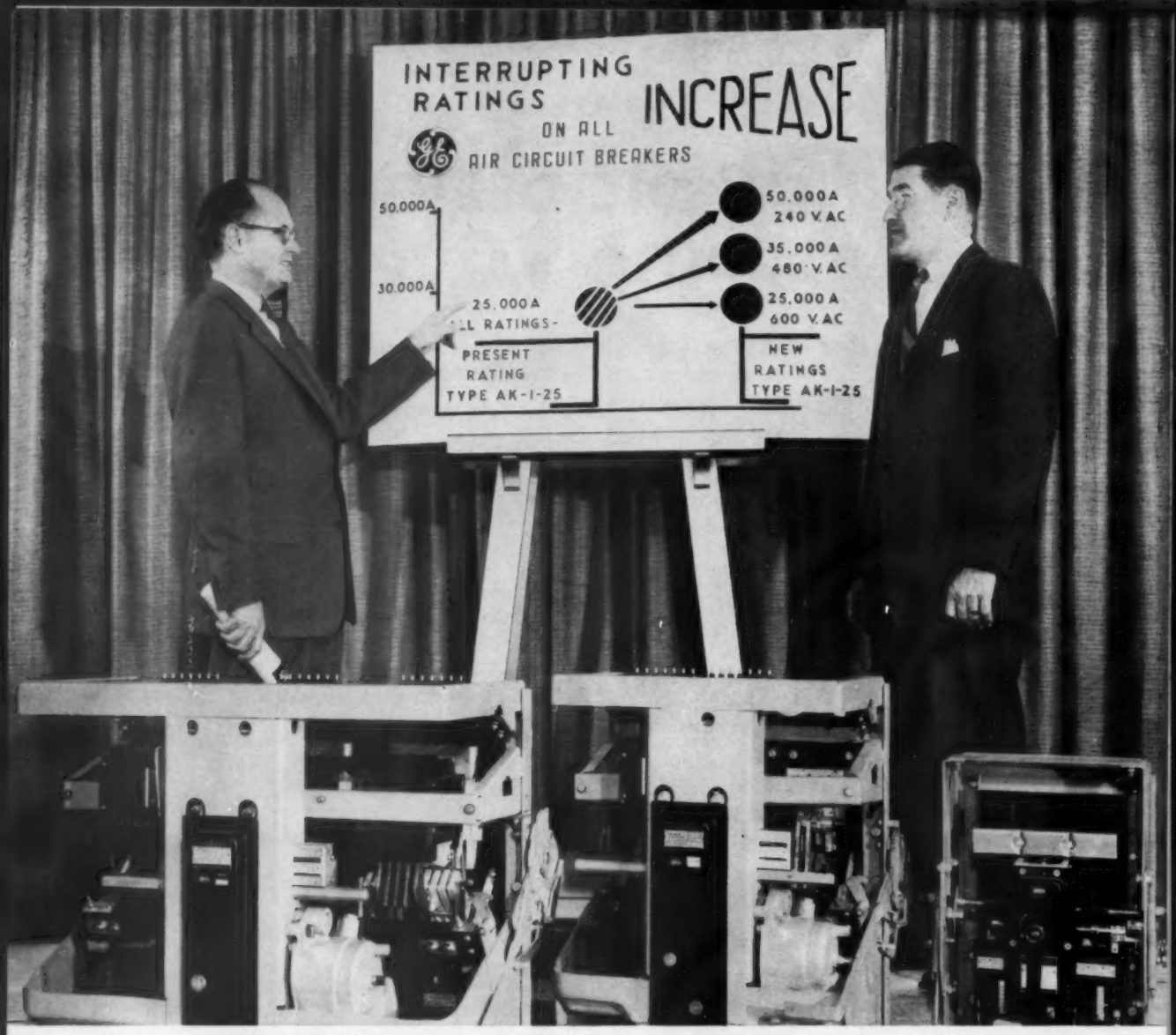
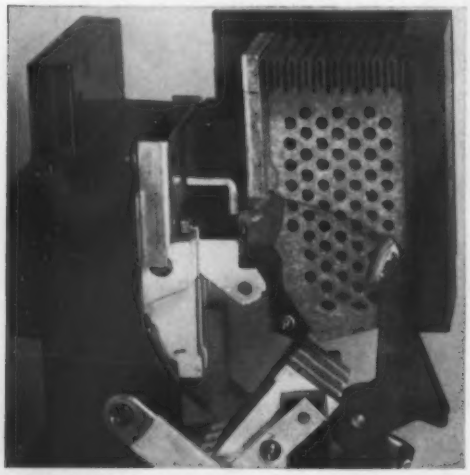
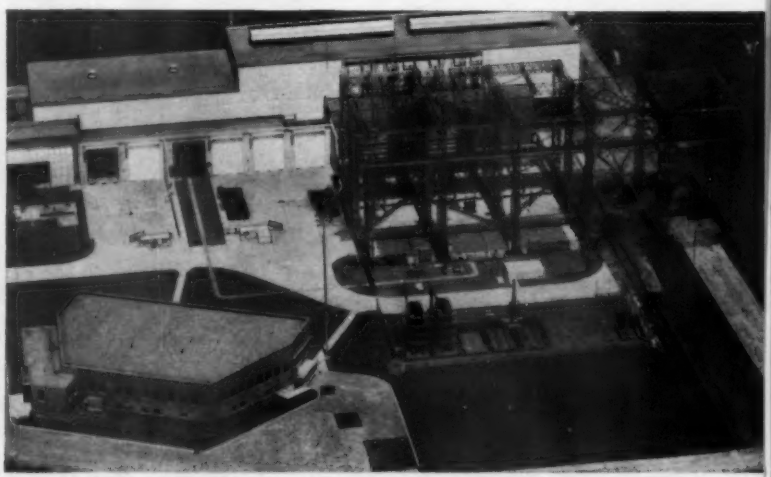


Don Beeman, Manager—Industrial Power Engineering—and Ben Beall, Manager—Air Circuit Breaker Engineering, discuss the importance to customers of the new breaker interrupting rating increases. Chart refers to only one example of the new breaker interrupting ratings.



MULTI-SLOT INTERRUPTERS provide the extra interrupting ability that makes this increase possible.



EXTENSIVE TESTING of all breakers at the Switchgear Development Laboratory have proven this extra interrupting ability for operation at popular voltages.

General Electric Air Circuit Breakers

INTERRUPTING RATINGS INCREASED

Appreciable Savings Now Possible in Many Low Voltage Switchgear Applications

INTERRUPTING RATINGS HAVE BEEN INCREASED from 25 to 50% on all popular ratings of General Electric Type AK air circuit breakers. Tests have shown that the efficient multi-slot interrupter is capable of interrupting higher currents at 480 volts A.C. and below.

THESE NEW RATINGS OFFER SIGNIFICANT SAVINGS in switchgear for customers using 208, 240 and 480 volts A.C. For example, in a typical commercial building utilizing a 208-volt system capable of a 100,000 ampere fault, the AK-1-25 feeder breaker may now be used where formerly an AK-1-50 feeder breaker would have been required.

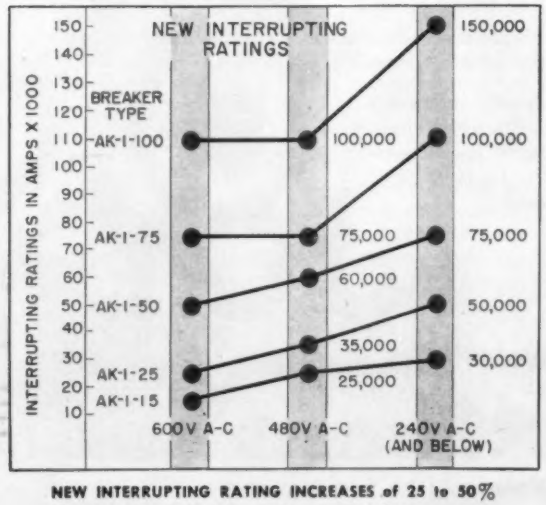
SAVINGS in a typical industrial plant application are shown in the table below.

MORE EFFICIENT USE OF SPACE is made possible through the application of smaller air circuit breakers with reduced space requirements.

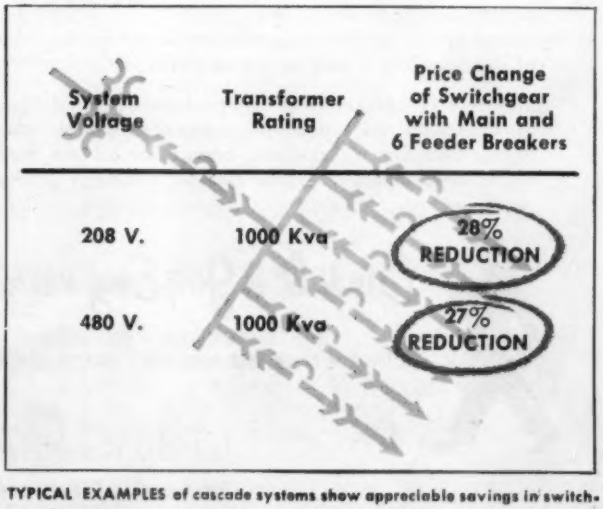
NEW APPLICATION INFORMATION on air circuit breakers can be obtained from your nearest G-E Apparatus Sales Office, or write for Bulletin GET-2479. Address your request to General Electric Company, Section 526-1, Schenectady 5, N. Y.

Progress Is Our Most Important Product

GENERAL ELECTRIC



NEW INTERRUPTING RATING INCREASES of 25 to 50% are shown for the popular 240 and 480 volt a-c systems.



TYPICAL EXAMPLES of cascade systems show appreciable savings in switchgear for customers with newly assigned interrupting ratings.

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YOU GET BIG COMPRESSOR ADVANTAGES...

UNEQUALLED DURABILITY!

TRULY CONTINUOUS SERVICE!

...in this SMALL HEAVY DUTY JOY WG-9

The Joy WG-9 was designed to give a moderate (up to 881 CFM) but *continuous* air supply. It is suited for use both as a main air supply for smaller requirements, and as an auxiliary, or decentralized, air source in larger plants.

Heavy duty service is assured through these many "big compressor" advantages, including exclusive features not found in any other units available for comparable service:

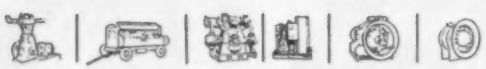
- Water cooled for continuous operation, greatest efficiency.
- *Exclusive* . . . replaceable-on-the-job cylinder liners for easy maintenance.
- Heavy duty, ball-type main bearings which need no adjustment.
- *Exclusive* . . . field-replaceable crosshead guide of special alloy, honed to mirror finish.
- Patented "Dual Cushion" valves for efficient, lasting life and quiet action.
- Full force-feed lubrication to all working parts.
- Rugged construction throughout for long life, low maintenance.
- Single-stage, double-acting . . . vertical design for greater economy of floor space.

Joy WG-9 Heavy Duty Compressors are available in fifteen different capacities and with a wide range of pressures from 30 lbs. up. Write for bulletins on standard, booster or oil-free models, to ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario*

WAD 1-5504

Consult a Joy Engineer

FOR VANEAXIAL FANS • COMPRESSORS
VACUUM PUMPS AND BOOSTERS • OXYGEN GENERATORS



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SPECIALISTS IN THE COMPRESSION AND MOVEMENT OF AIR AND GASES SINCE 1885

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Rugged, lightweight 6' sections are amazingly easy to handle.

New BETTER way to insulate BIG pipe

GUSTIN-BACON gb SNAP*ON

Recently, more than a mile of large 250° pipe was insulated at an eastern refinery in record time and at unprecedented low cost. The key to the success of the installation was revolutionary G-B Snap*On pipe insulation—one-piece molded cylinders of fine glass fibers.

Photos tell the story. Lightweight 6' sections of 20" Snap*On, 1½" in wall thickness, were hoisted to the job by a man with a rope. Unlike segmental pipe insulation, Snap*On required no springs or special tools for application. Two men accomplished the job quickly by snapping Snap*On sections snugly around the pipe and tracer line. A weatherproof jacket was applied in accordance with standard practice for outdoor installations. There was no breakage or waste, for flexible, resilient Snap*On is tough, does not break or crumble. No clean-up time was involved because Snap*On does not flake or chip.

Next time you have chilled or heated piping to insulate, if you want maximum thermal efficiency, easier application and permanence, specify G-B Snap*On. There is **nothing** like it!

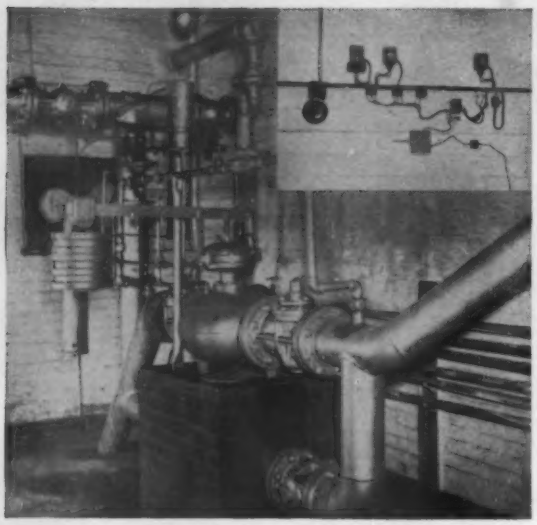
Write for 8-page brochure or see the Yellow Pages for name of your local distributor who carries local stocks of Snap*On.

GUSTIN-BACON *Manufacturing Company* GUSTIN gb BACON

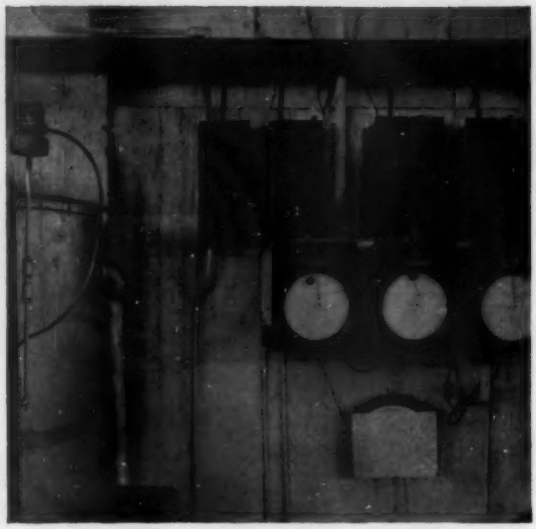
Thermal and acoustical glass fiber insulations • Pipe Couplings and fittings • Railroad gaskets and supplies

244 W. 10th ST., KANSAS CITY, MO.

For more facts circle 510 on Reply Card



UNATTENDED GAS PLANT IS PROTECTED AGAINST PRESSURE FAILURES *at this central distribution point of the New York State Electric and Gas Co., Auburn, N. Y. Three Honeywell Pressuretrol units and one Honeywell Vaporstat unit sound alarm at a manned sub-station at first threat of pressure failures.* **Control equipment cost—$59.35***



SAFE OPERATION OF CAUSTIC CHARGING TANKS IS ASSURED *at the Sayles-Biltmore Bleacheries of Asheville, N. C. Whenever caustic level in tank rises to overflow danger point, a Honeywell Vaporstat unit warns operator by energizing an alarm system.*

Control equipment cost—$37.25*

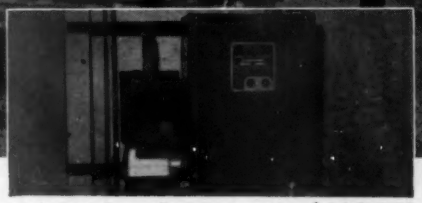
Honeywell Industrial

SENSITIVE ALARM WARNS OF SOLENOID VALVE FAILURE *in a water-cooled vacuum pump at the Spaulding-Moss Co., Boston, Mass. Before rising water temperature can cause serious pump damage, a Honeywell temperature controller automatically shuts off pump and signals operator.*

Control equipment cost—$21.30*

PERILOUS CLIMBS TO ROOF ARE NOW AVOIDED *at the Curtis Hotel in Minneapolis, Minn. thanks to the installation of Honeywell Modutrol and Pressuretrol units. Rooftop adjustments of a butterfly valve for desired pressure changes in an exhaust steam heating system can now be made by operator in boiler room.* **Control equipment cost—$75.75***

RISK OF FIRES FROM FLAME OR POWER FAILURE IS ELIMINATED *at this steam plant for a Shell Oil Co. installation in Southern Illinois. After a fire which destroyed the original plant, Honeywell Protectoglo combustion safeguard equipment was installed which now provides complete safety control in many phases of the steam plant operation.*



Control equipment cost—$138.04*

Controls *Increase safety*

THE safety factor is vitally important in almost any phase of production activity. Often overlooked is the fact that many solutions to weighty safety problems lie in the low-cost applications of simplified controls.

For example, in steam plant installations, the threat of fires from power failures and gas pressure fluctuations is counteracted by Honeywell Industrial Controls . . . such as the Protectoglo combustion safeguard equipment. In addition, Honeywell alarm systems and limit switches provide for immediate adjustment whenever dangerous situations threaten.

At your plant, too, versatile Honeywell Controls might well be applied to the reduction of dangers and risks and the assurance of safe working conditions for plant personnel.

Low-cost Honeywell Controls are uncomplicated in installation and in construction . . . designed to do a job effectively, inexpensively.

Throughout your plant you may find numerous opportunities for Honeywell Controls to eliminate the risk element . . . as well as increase production, reduce costs, improve quality.

Your nearby Honeywell sales engineer will be glad to discuss how you can *increase safety* through the use of these controls. Call him today . . . he's as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, Wayne and Windrim Avenues, Philadelphia 44, Pa. *Also manufacturers of a complete line of precision measuring, recording and controlling instruments.*

******Approximate cost—Prices subject to change without notice.*

MINNEAPOLIS
Honeywell
BROWN INSTRUMENTS
First in Controls

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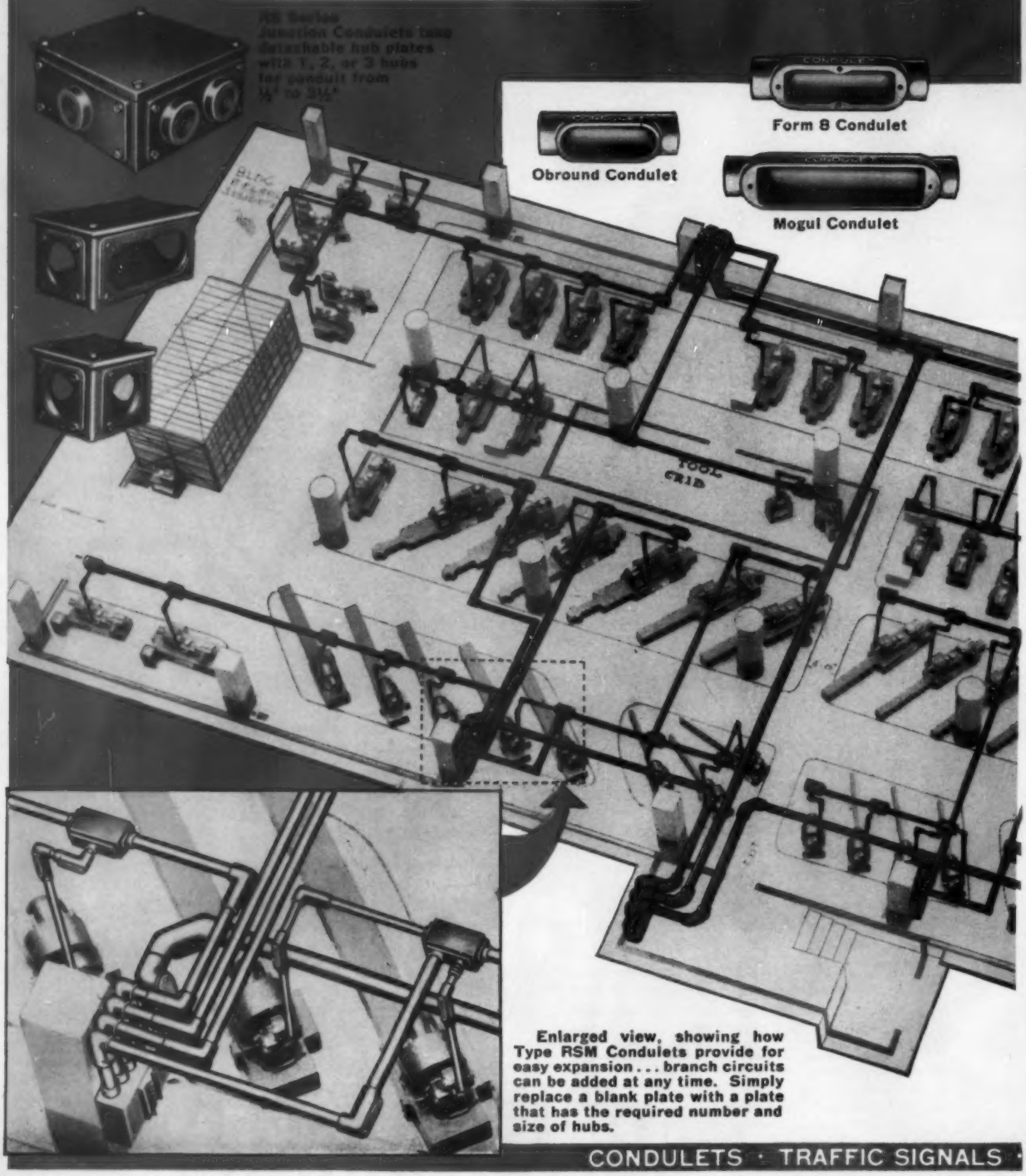
for MODERN WIRING... the CONDULET* and rigid

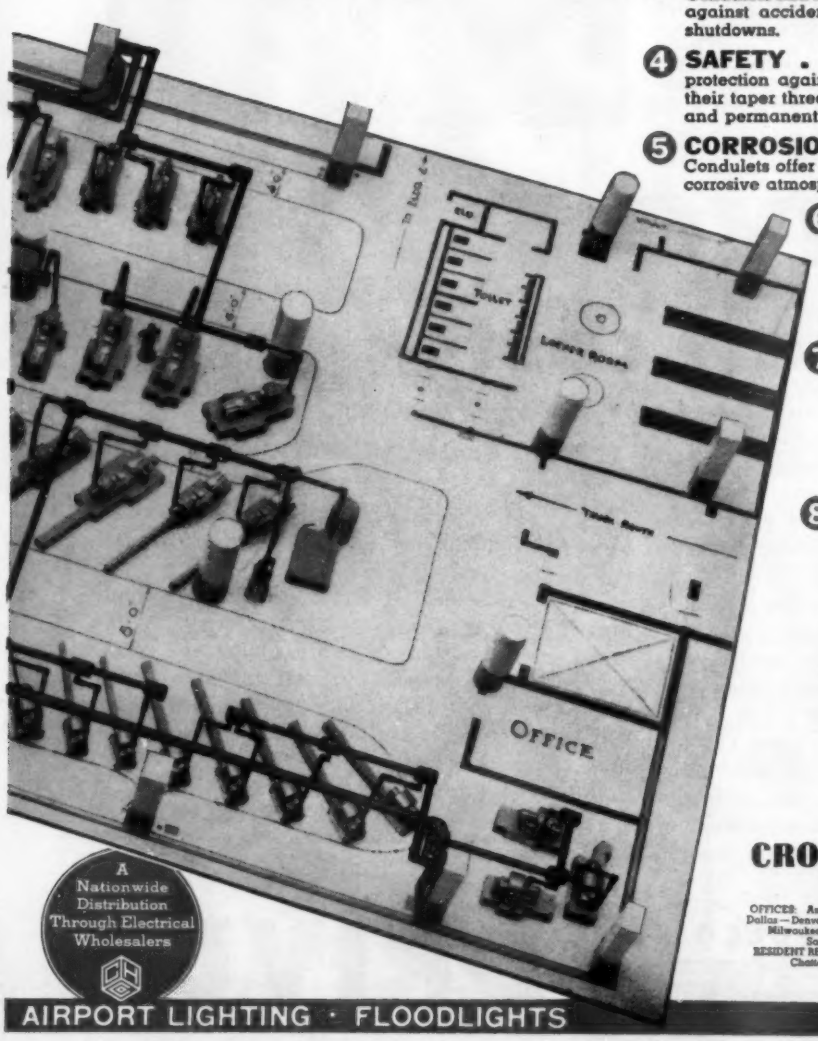

RS Series Junction Conduits have detachable hub plates with 1, 2, or 3 hubs for conduit from ½" to 3½"
Form 8 Condulet
Obround Condulet
Mogul Condulet
TOOL CRIB

Enlarged view, showing how Type RSM Condulets provide for easy expansion... branch circuits can be added at any time. Simply replace a blank plate with a plate that has the required number and size of hubs.

CONDULETS · TRAFFIC SIGNALS

conduit method gives YOU definite advantages!

The photograph below shows a model of an actual installation in a screw machine department. It is an outstanding example of a layout that meets modern industry's need for flexibility, while retaining the enduring protection and safety that can only be given by cast Condulets and rigid conduit.



1 FLEXIBILITY . . . A modern Condulet installation, like the one illustrated below, provides for the vigorous growth and changing conditions of a modern industry. The RS Series Condulets with their detachable hub plates make it easy to change circuits or add additional circuits at any time.

2 UNIVERSAL APPLICATION . . . Galvanized Condulets and galvanized rigid conduit may be used under all atmospheric conditions and occupancies.

3 MECHANICAL PROTECTION . . . Cast Feraloy Condulets and rigid conduit provide the best possible protection against accidental damage to the wiring — prevents costly shutdowns.

4 SAFETY . . . A Condulet installation gives maximum protection against personal injury and fires. Condulets with their taper threaded hubs and rigid conduit provide a reliable and permanent low resistance path to ground.

5 CORROSION RESISTING . . . Cast Feraloy Condulets offer the best protection wherever moisture, dust or corrosive atmospheres are present.

6 ECONOMY . . . Direct comparison of Condulet and rigid circuit installations with other wiring methods show comparable installed costs. The durability, safety, and low maintenance cost of Condulet installations produces savings which pay dividends over the years.

7 QUALITY . . . All Condulets are built to Crouse-Hinds' high standard of quality with painstaking care by skilled craftsmen. Thousands of Condulet installations that are still in active service after twenty, thirty, forty or more years offer positive proof that the trademark CONDULET stands for reliability and long life.

8 VARIETY . . . Thousands of types and sizes of Condulets, plugs and receptacles, and lighting fixtures are listed in the Condulet Catalog, including a complete explosion-proof and dust-tight line for use in hazardous locations. There is a Condulet for every purpose.

On your next electrical layout, whether modernization or new construction, plan to get all of the benefits of sturdy cast Feraloy Condulets and rigid conduit.

*CONDULET is a coined word registered in the U. S. Patent Office. It designates a product made only by the Crouse-Hinds Company.

A Nationwide Distribution Through Electrical Wholesalers

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AIRPORT LIGHTING · FLOODLIGHTS

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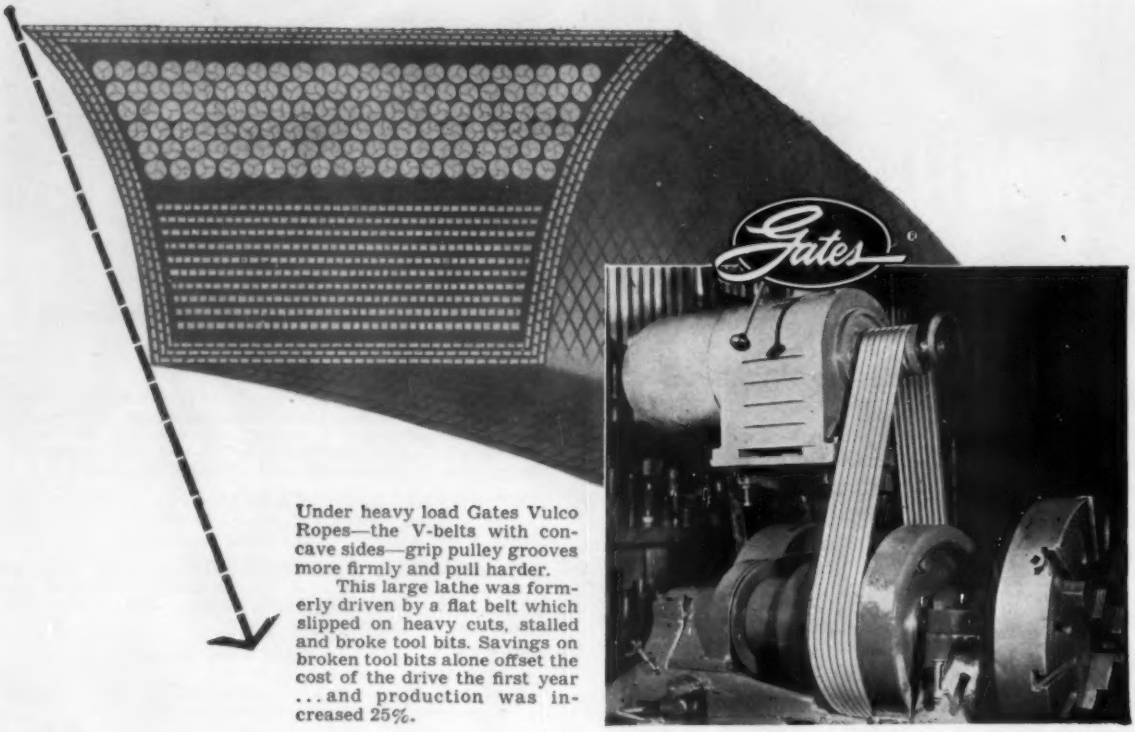


Under heavy load Gates Vulco Ropes—the V-belts with concave sides—grip pulley grooves more firmly and pull harder.

This large lathe was formerly driven by a flat belt which slipped on heavy cuts, stalled and broke tool bits. Savings on broken tool bits alone offset the cost of the drive the first year ...and production was increased 25%.

Concave sides keep belt costs down!

Industry is saving thousands and thousands of dollars every year by specifying Gates Vulco Ropes—the V-Belts with *concave sides* (U.S. Pat. No. 1813698).

Here's the interesting reason *why* Gates belts save money:

On the bend around the sheave the *precisely engineered* concave sides (Fig. 1) of the Gates belt fill out and become straight (Fig. 1-A). Thus the belt makes uniform contact with the sides of the pulley. That means sure pulling power and *even distribution of wear*. Longer wear, fewer replacements cut belt costs...reduce down time...contribute to profits.

Simple test proves value of concave sides

Bend a straight-sided belt (Fig. 2) and feel the sides *bulge out* around the bend. The bulging sides prevent the belt from fitting evenly in the pulley groove (Fig. 2-A). Uneven contact causes uneven wear...shortens belt life...increases costs.

Keep belt costs *down* by specifying Gates Vulco Rope Drives—the V-Belt with *concave sides*. Belts you need are readily available from nearby distributor stocks. The Gates Rubber Company, Denver, Colorado—*World's Largest Maker of V-Belts.*

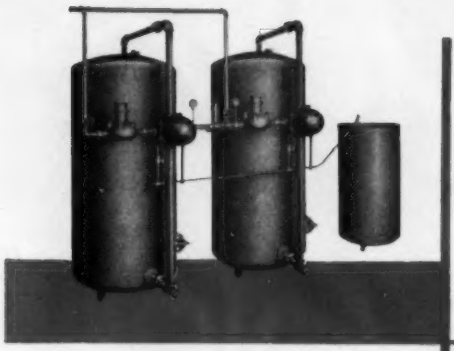
Gates Engineering Offices and Distributor Stocks are located in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.

TPA 25-A

GATES VULCO ROPE DRIVES

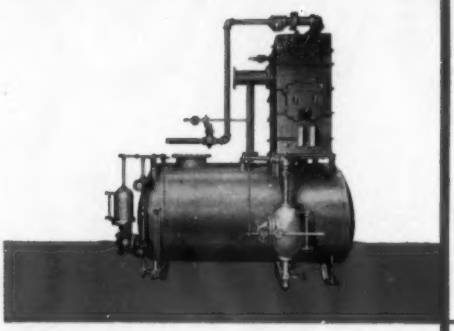
For more facts circle 513 on Reply Card

Designed to Prevent Boiler Scale and Corrosion *ECONOMICALLY*



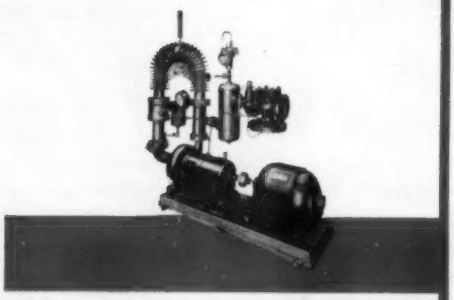
COCHRANE ZEO-FLO ZEOLITE SOFTENER

Designed for small and medium size plants. Efficiently removes hardness and scale producing calcium and magnesium from water at low operating costs. Provides positive, accurate control of the softening and regeneration cycle. Simple to operate and install. No technical knowledge of the softening process or equipment is required. *Write for Publication 4505-A.*



COCHRANE UNI-PAC DEAERATOR

For small and medium size power plants. Delivers deaerated water with an oxygen content guaranteed not to exceed 0.005 c.c. per litre (less than 7 parts per billion)—generally recognized as zero oxygen! Factory assembled. Completely self- contained. Easy to install. Wide range of heater sections, storage tanks and accessories to meet practically any plant requirement. *Write for Publication 4643.*



COCHRANE C-B CONDENSATE RETURN SYSTEM

Reduces steam cost to absolute minimum by direct return of condensate from process equipment to boiler at steam temperature.

Automatically eliminates entrained air from circuit.

Steps-up Latent Heat Transfer resulting in Increased Production—Better Product Quality, and Minimum Maintenance.

Several hundred installations in Package Boiler Plants such as Corrugating—Food—Laundry—Rubber—Chemical, etc.— PROVE THIS! *Write for Publication No. 3250.*

C100.10

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Pottstown Metal Products Division—Custom built carbon steel and alloy products

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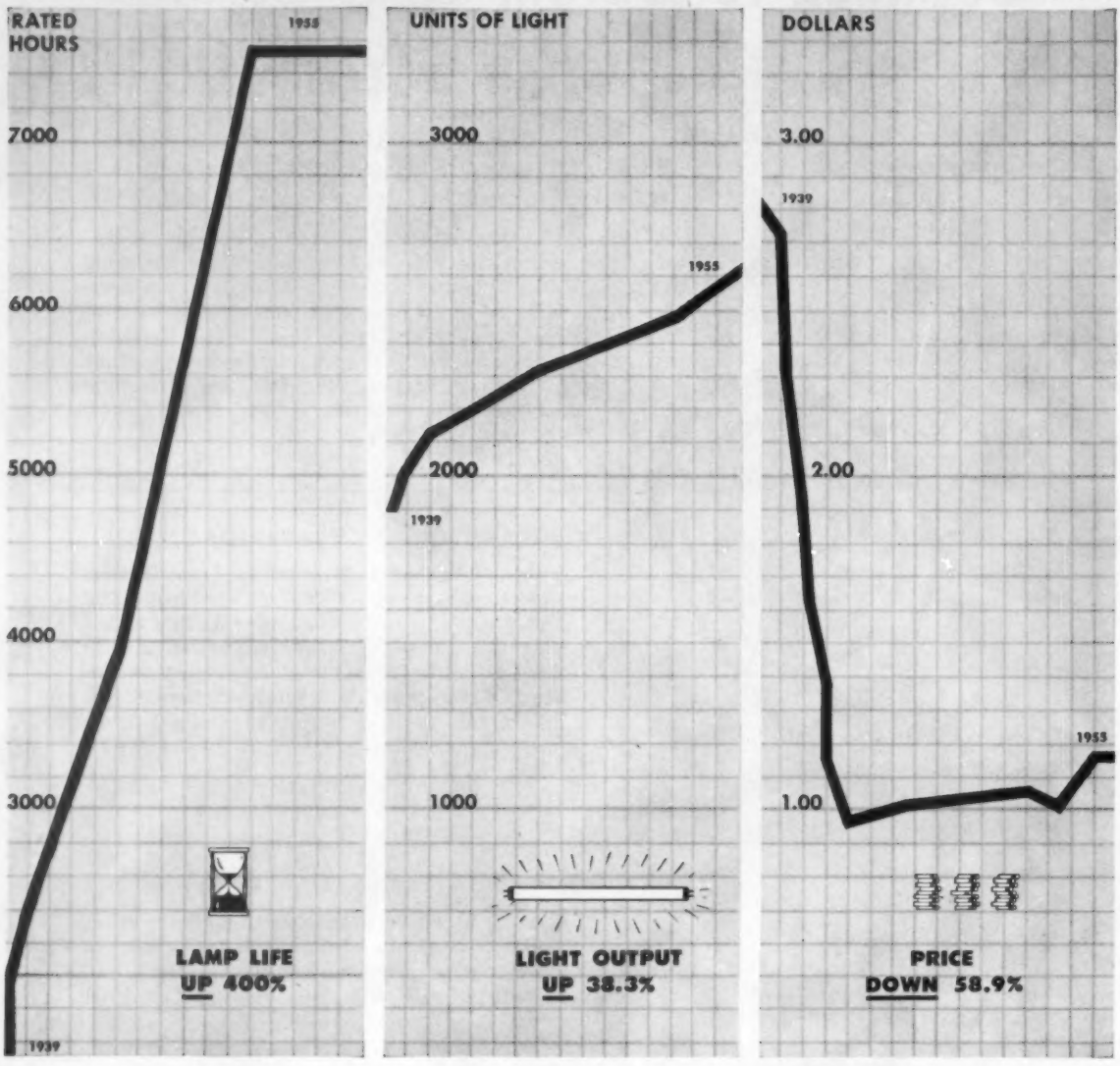
YOU EXPECT THE BEST VALUE FROM G-E FLUORESCENT LAMPS



16 times more value for your fluorescent lamp dollar than in 1939

Today you don't have to pay more than $1.15 for the finest fluorescent lamp made: General Electric. Sixteen years ago it would have cost you $2.80 or $1.65 more. And while price has been going down, we've been pushing quality up. General Electric has upped light output 38%, increased lamp life 400%.

In terms of what you really judge lamps by, a General Electric 40-watt fluorescent lamp that lists at $1.15 today is a *16-times bigger value than it was in 1939.*

For further information, contact your G-E lamp supplier or write to Lamp Division, General Electric, Department 166-PE3, Cleveland 12, Ohio.

Progress Is Our Most Important Product

GENERAL ELECTRIC

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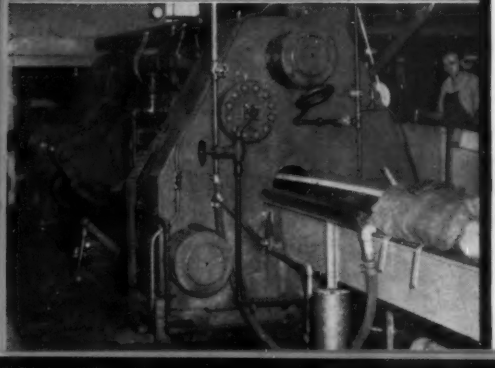
STANOIL
INDUSTRIAL OIL

does heavy chores for
Light Metals Corporation

Tool Room Superintendent Max Chase (left) and Production Engineer Peter Van Dyke (right) with Standard lubrication specialist R. T. Cleland inspect frame of extruded aluminum. Bob Cleland, a graduate of Michigan State with a B.S. in Mechanical Engineering and of Standard's Sales Engineering School, has the background to provide customers with competent technical service on their lubrication problems. This training and experience, customers have found, pay off for them.

Light Metals Corporation uses this 1,250 ton Hydropress for extrusion of aluminum shapes for aircraft, automotive and major appliance industries. Press operates at 2,840 psi in the hydraulic system. Hydraulic medium is STANOIL.



Three years ago Light Metals Corporation, Grand Rapids, put their 1,250 ton Hydropress into operation. The initial fill for the hydraulic system was STANOIL Industrial Oil. The press has operated continuously since its start up. There is no evidence of deposits or varnish anywhere in the hydraulic system. Light Metals Corporation looks forward to many more years of such trouble-free operation.

Why was STANOIL ordered by Light Metals for their Hydropress? The answer is found in the service STANOIL has given in other equipment. Back in 1948 when a Watson-Stillman extrusion press went into operation for Light Metals, STANOIL was chosen as the hydraulic oil. As with the Hydropress, STANOIL has a perfect performance record. The Watson-Stillman press has operated seven years without shutdown because of hydraulic fluid failure.

This kind of service from a hydraulic oil means Light Metals Corporation can turn out extruded aluminum shapes for the aircraft, automotive and major appliance industries with high performance and low maintenance factors that mean bigger profits. Reason enough for relying on STANOIL.

STANOIL Industrial Oil can perform for you just as it is doing for Light Metals Corporation. In the Midwest a lubrication specialist from your nearby Standard Oil office will explain how. Call him. Or contact Standard Oil Company, 910 S. Michigan Avenue, Chicago 80, Illinois.

STANDARD OIL COMPANY
(Indiana)

STANDARD

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From the ageproof mineral

ASBESTOS

... comes the smooth-surfaced built-up roof

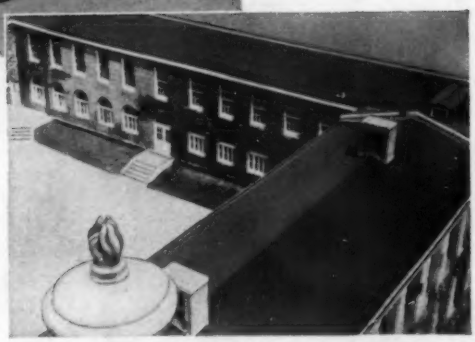
FLEXSTONE*

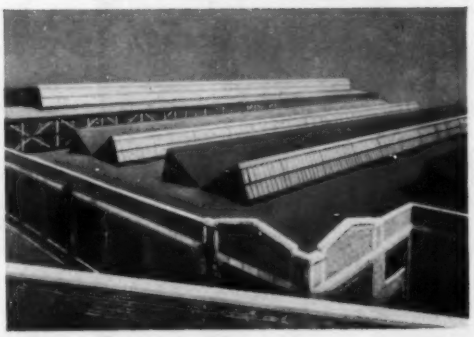
which provides a flexible covering of stone

Because they are made of the mineral, asbestos, the felts of a Johns-Manville Flexstone Built-Up Roof assure lasting service and protection. They will not support combustion. They effectively resist the drying-out action of the sun . . . won't rot, are weatherproof and need no periodic coating.

Flexstone Built-Up Roofs are smooth-surfaced . . . permit thorough drainage . . . make damage easy to locate and repair. These superior advantages are also provided by the J-M Flexstone Special Built-Up Roof . . . developed especially for dead-level decks.

For complete information about Flexstone Roofs and J-M Asbestile* Flashing System that provides thorough water tightness and effective treatment for critical roof areas, see your Approved Johns-Manville Contractor. He's listed in the Classified Section of the telephone directory.





For free copy of Flexstone folder BU-51A, write Johns-Manville, Box 158, New York 16, N. Y. In Canada, write 565 Lakeshore Road East, Port Credit, Ontario. *Reg. U. S. Pat. Off.

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Consult your newspaper for time and station.

Johns-Manville *FLEXSTONE** Built-Up Roofs

ASBESTOS CORRUGATED TRANSITE* • ACOUSTICAL CEILINGS • DECORATIVE FLOORS MOVABLE WALLS • ETC.

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BULLETINS just released and of immediate plant interest

ELECTRICAL EQUIPMENT

101 D-C Motors—This 12-pp illustrated bulletin describes company's newest line of industrial d-c motors with dynamic response. Discusses advantages of controlled power, speed range of motors, speed and rate of acceleration, and mechanical design. Table of dimensions and a selection data chart are included. Reliance Electric and Engineering Co.

102 Motor Control Data—This little pocket-size booklet (5411) on electric motor controls contains 46 pp of photos, specifications and prices. It is designed as a handy reference for magnetic starters and contactors, push buttons, combination starters, drum controllers, and switches. Includes heater coil selection tables for standard and slow type overload relays. Furnas Electric Co.

103 Distribution System Check List—Provided in this folder is a check-list for modernizing an electrical distribution system. Covers adequacy and condition of equipment, possibilities for improvement, time when improvements should be made, and methods to use. Continental Equipment Co.

104 Enclosed Conductor Systems—Catalog 8-54, 28 pp, describes Insul-8-Bar enclosed conductor systems designed for the safe electrification of cranes and monorails. Explains principles of these insulated systems, and shows why they meet requirements without need for special engineering. Contains an illustrated parts list, engineering data, selection information and installation instructions. Insul-8-Corp.

105 Battery Manual—Battery selection techniques are emphasized in 20-pp Bulletin 210, a revised edition of this manufacturer's manual on storage batteries for stand-by power, emergency lighting and switchgear applications. A discussion of charging equipment and simplified battery maintenance procedures is included. Storage battery installation procedures are described and illustrated by photos. Exide Industrial Div., The Electric Storage Battery Co.

106 Aluminum Bus Conductors—The availability, properties, advantages and methods of joining and bending aluminum electrical bus conductors are detailed in this 12-pp bulletin. Prepared to assist plant engineers in converting to aluminum bus—bulletin covers rectangular bar, tubular conductor and solid round bar. Contains information on thermal, electrical and physical properties, dimensions, weights and tolerances for a large range of shapes, alloys and sizes. Gives specific engineering data for each type of bus conductor listed. Kaiser Aluminum & Chemical Sales, Inc.

107 Wire for Sound Systems—Shielded wire and cable for microphone and sound system use is described in illustrated Bulletin SW-1. Covers super flexible and copper shield microphone cables; semi-rigid PVC cables for speech input and sound systems; PVC insulated signal wires; intercommunication cables, others. Whitney Blake Co.

108 Finding Fault Grounds—This 32-pp illustrated booklet covers use of the Allen ground detector in the detection and location of electrical fault grounds. Separate chapters cover grounded vs ungrounded systems, operating instructions, explanation of misreadings encountered, complete cancellation, detection of fault grounds in lead-covered underground cable, tracing buried and/or hidden elements. Excel Electric Service Co., Inc.

109 Subminiature Switches—Twelve-pp Catalog 75 covers a line of subminiature snap-action precision switches, auxiliary actuators, subminiature switches, toggle and push button subminiature switch assemblies. Gives information on company's standard subminiature (single-pole, double-throw) basic switch as well as the long life, high temperature and turret terminal versions, also auxiliary actuators. Micro Switch, Div., Minneapolis-Honeywell Regulator Co.

110 Crane, Hoist Electrification—This bulletin on the safe electrification of cranes and hoists details advantages of this company's system of enclosed trolley busway electrification. Tells what it is and how it works, and pictures its use in numerous installations. Feedrail Corp.

111 Cable Support System—Bulletin 754-A describes a standardized system for supporting cable. Pictures troughs, covers, connectors and fittings. Stresses versatility and safety of the system, reduced drafting room detail required, use of standard low cost components, other advantages. P-W Industries, Inc.

112 Standard Cable Trough — Sixteen-pp Bulletin 67A describes this manufacturer's standard cable trough designed to provide sturdy raceways at varying widths at different levels and in any direction. Fully illustrated with photos and dimensional drawings, bulletin shows the basic unit and gives ordering data on elbows, branches, reducers, connections, clamp brackets, etc. Includes tracing templates, load deflection data. T. J. Cope, Inc.

113 Electrical Installations—This handsome 44-pp book illustrates and describes recent electrical installations. They include generating units, control room equipment, line transformers, substations, distribution equipment, arc furnaces, conduit runs, rectifiers, lighting equipment, strip mills, others. Patterson-Emerson-Comstock, Inc.

MECHANICAL POWER TRANSMISSION

114 Motorized Reducers—Of practical interest to plant engineers concerned with gear drives up through 75 hp rating, is 28-pp Bulletin 3100-1954. It consolidates selection tables, dimensions, weights, overhung load ratings, and thrust capacity ratings needed to select horizontal, vertical, or right-angle motorized reducers in all-motor or integral design. A foldout section bound into the middle of the book contains illustrated information on mounting positions, low speed shaft connections, and product features. The Falk Corp.

115 Adjustable Speed Drive — Twelve-pp Bulletin SF-1 describes company's adjustable speed drive, giving construction details, capacities, characteristic torque curves, dimensions, efficiencies and advantages. Contains chart plotting typical torque and load curves, an application data table, and a diagram illustrating dimensions. Dynamatic Div., Eaton Mfg. Co.

116 Multi-V-Drives—Master Engineering Manual V-1400, 100-pp, features company's Multi-V-Drives, presenting a scientific and simplified method for rating V-belts. Lists each popular 60 cycle motor speed with drive selections and gives possible stock sheave combinations, as well as arc and length correction factors. Use of a simple graph to find effective diameters eliminates the new De factor for sheave diameter and ratio and saves on multiplication steps. Service factors for proper duty classifications are based on load requirements. Information on products and range of stock size sheaves with bore limitations is given. Worthington Corp.

117 Worm Gear Sets—Ratings and specifications on a line of worm gear sets are presented in 24-pp Engineering Manual SW 1. Provides load characteristics and detailed selection information, also dimensions and part numbers. These worm gear sets are available in standard ratios from 4½ to 71, and have application in cranes and hoists, machine tools, furnace drives and metal mills. Foote Bros. Gear and Machine Corp.

118 Steel Pulleys—A pictorial review of this company's steel pulleys, their manufacturing processes and some of their end uses is provided in this 16-pp brochure. Shown and briefly described are the manufacturing techniques and skills required to produce these pulleys for power transmission, material conveying, heating and air conditioning and other requirements. The American Pulley Co.

119 Double Helical Gears—Information on specifications, construction design, testing and various applications for company's double helical gears is offered in 12-pp Bulletin 1958E. It also contains data on lubrication, diagrams, application charts listing dimensions in inches as well as illustrations of parts such as gear and pinion, sleeve bearings, oil bearings, oil baffles and oil pump. Worthington Corp.

120 Torque Converters—This 8-pp catalog, illustrated in color, describes company's line of Torcon torque converters. Shows models, attachments for specific adaptations, and describes construction of the converters. Pictures applications in which a torque converter offers worthwhile advantages. Transmission Div., Clark Equipment Co.

121 Flexible Couplings—Catalog 55-A, 24 pp, presents a line of rubber-bronze bushed flexible couplings, explaining how they work and what they are designed to do, and providing ratings and service factors. Gives data on forged steel and cast semi-steel couplings for heavy duty use, shear pin couplings, brake drum couplings, flange type of bolting to flywheels, other types. Includes dimensions, tips on use. Ajax Flexible Coupling Co., Inc.

CONSTRUCTION

122 Cast Floor and Roof Slabs—This 8-pp booklet outlines properties and uses of company's monolithically cast slabs, diagrams basic structural and mechanical details, and describes erection procedure. Describes a new 3-core 6-by-16 in. slab (not yet available in all manufacturing areas), along with sizes now in general use. Contains installation diagrams, information on specifying. The Flexicore Co., Inc.

123 Structural Bolts—This 8-pp booklet outlines eleven distinct advantages of company's high strength structural bolts for quick, safe low cost structural fastening. Includes ASTM Specification A-325 needed for the assembly of structural joints, as well as ordering information. Republic Steel Corp.

124 Aluminum Building Products—Twenty-pp Form AD-427 is devoted to modern-looking, low-cost industrial building products—roofing and siding, flat flashing stock, fasteners and preformed accessories, as well as perforated corrugated sheet particularly suited for sandwich wall construction. Included in this booklet are roofing and siding weight and coverage tables, loading tables, roofing and siding details. Aluminum Co. of America.

125 Glass Blocks—This 8-pp booklet describes company's glass block for reduction of glare and heat, recently added to their line of functional glass blocks. It shows in detail the physical performance of the blocks, illustrating its chief principle—a pale green diffusing screen that helps reduce the intensity of glare and heat. Pittsburgh Corning Corp.

On pages 199-200 are two postage-free Reader Service Cards provided for your convenience in ordering these bulletins. You may also use the cards to order any literature mentioned in ads.

126 Glass for Severe Sunshine—Functions of a new glass block designed specifically for use in areas with severe sun conditions are described in this folder. Explains how 80-F glass block rejects excess light and heat, by reflection, when sun is at or near 45-deg altitude. Charts show how this glass block affords year-around brightness control for all exposures. The Kimble Glass Co.

127 Versatile Insulation—"For More Reasons than One . . ." is an 8-pp color-illustrated booklet showing why Foamglas was chosen as the insulating material in a wide range of installations. They cover walls, roofs, tanks and equipment, piping and cold storage areas. Booklet also explains what Foamglas is and gives its physical properties. Pittsburgh Corning Corp.

128 Luminous Ceilings—The advantages of "luminous environment"—gained through the use of company's luminous ceilings—are outlined in this illustrated 16-pp bulletin. Con-

BULLETINS

(Begins on page 21)

struction and design features are discussed and applications described. Points out its sound absorption qualities, utilization of space above ceiling for air distribution, and savings in maintenance. Specifications, installation diagrams are included. Luminous Ceilings Inc.

STORAGE

130 On Steel Shelving—Advantages of company's adjustable steel shelving are pointed out in this illustrated folder. Photos show a few of more than 1000 possible combinations. Open and closed type, ledge type and various combinations of swinging and sliding doors are featured. Text describes ease of assembly, advantages of the various types of shelving. Standard Pressed Steel Co.

131 Storage, Handling System — Complete with diagrams and tables, this comprehensive 20-pp booklet explains the Stackbin system for handling and storing of parts and materials—how it works and how it serves. The line of bins, racks, pallets, movable bases, shelves, assembly bins, trucks and tool storage equipment is illustrated. Stackbin Corp.

132 How to Handle Storage—Equiptogram 254 is a 12-pp booklet offering practical solutions to storage problems. Tells a plant engineer how to set up his own facilities, make surveys, elevation drawings and floor plans. It is particularly useful for smaller layouts where services of layout specialists are not required. Equipto Div., Aurora Equipment Co.

133 Better Storage Methods—Catalog 700, 16-pp, tells how to increase warehouse capacity through better use of existing facilities and, where advisable, through use of special equipment. Exploring the problem of proper space utilization, booklet points out advantage of using ceiling height as well as floor space. Correct use of special storage equipment, such as long-span shelving, and Rotabins, is described. The Frick-Gallagher Mfg. Co.

MATERIALS HANDLING

134 Handling Equipment File—This comprehensive catalog of materials handling equipment is loose-leaf bound and contains a wealth of engineering data, illustrations of equipment and applications. For quick reference, the book is divided into sections on general information; electric hoists; ratchet hoists; hand and trolley hoists; winches, overhead, jib and gantry cranes; floor cranes; chain; load binders and guards; shop equipment, and accessories. Each section presents details with respect to types, sizes, hand and power operations. Book is available to qualified plant engineers, please state your job title when requesting it. Ohio Hoist & Mfg. Co.

135 Electric Trucks—This 24-pp catalog illustrates and describes company's battery-powered, rider-type trucks for 6-ft aisle operation, together with attachments for special applications. Also shown is the Porta-dock, a 6000 lb capacity portable dock for loading and unloading motor trucks from ground level. Includes 2000- and 3000-lb capacity trucks for tiering double-face pallets; single-face pallet and skid platform tiering trucks; as well as low-lift trucks, and platform tiering trucks. The Raymond Corp.

136 Lift Truck Pointers—The sixth printing of this company's 24-pp booklet, "How to Operate a Lift Truck," is now available. Cartoon technique is used in this booklet, which is designed for easy reading and packed with information on lift truck operation, preventive maintenance, safety and basic materials handling. Drawings for setting up an obstacle course are included. Slanted for both beginner and experienced operator, this booklet can be studied individually by operators or used as a guide by instructors in training programs. Hyster Co.

137 Overhead Cranes — Installation photos showing company's cranes in action for foundries, railroads, power plants, steel mills and general industry are featured in this 12-pp booklet (Unit 80). It also spotlights the contribution made to better handling by each of the 14 major features of the cranes. Whiting Corp.

138 Jib Cranes—Wall bracket, mast type and 360-deg floor mounted jib cranes are described as to design and application in this 8-pp illustrated bulletin. Also shown are standard jibs for special uses, and electrification, hoist and transfer equipment. Dimensions and capacity data are included. Abell-Howe Co.

139 Grab Bucket Cranes—Bulletin C9-3 devotes several of its 24 pp to suggestions on selecting the proper type of grab bucket crane for a particular service. Design and construction details incorporated are described and pictured and clearance dimensions provided. Booklet is generously illustrated with photos of cranes in use in incinerator plants, cement mills, sugar refineries, other industries. Harnischfeger Corp.

140 Transit Crane—Twelve-pp Bulletin 15-B-TC-1 describes a transit crane of 15-ton capacity. Illustrated by job application photos and closeups of mechanical features, the booklet includes a list of specifications and working ranges, plus brief, easy-to-read description of the machine's advantages. Bucyrus-Erie Co.

141 Power Cranes in Industry—Technical Bulletin 5 is a 24-pp generously illustrated booklet on free moving cranes in industrial plants. Shows their use in warehousing and outside storage, and in production handling. Various types of attachments are shown, and the advantages of the cranes are detailed. Power Crane and Shovel Ass'n.

142 Industrial Conveyors—Twelve-pp Catalog 4000 describes and pictures portable stacking conveyors, floor-to-floor conveyors, horizontal belt convevors, gravity roller conveyors, and gravity wheel conveyors. Includes a wide range of types and sizes, especially adapted to loading and unloading, storage, warehousing. Gives standard and optional features of the conveyors, includes sizes and dimensions. Samuel Olson Mfg. Co., Inc.

143 Sling Chain Handbook—Illustrated Data Book 100, 32-pp, presents "how to do it" information on sling chains—from ordering to care, use and inspection. Contains diagrams, charts and tables on standard and special styles of sling chains and attachments, and their sizes, weights, and working load limits under many conditions. Columbus McKinnon Chain Corp.

144 Wire Rope Assemblies—Catalog 5201, 22-pp, describes a line of flexible wire rope with permanently attached fittings of various types and sizes to make a complete operating flexible unit. Shows use as operating controls, as a part of machinery and equipment, or for slings and hoists. Photos and diagrams, as well as specifications for all types of assemblies are included. Macwhyte Co.

145 Re-Usable Containers—Sixteen-pp Technical Bulletin 601 stresses advantages gained by packaging, storing and shipping industrial materials in re-usable metal containers. Shows how lightness and compactness of these containers combine with the feature of re-usability to permit economies in weight reduction and space saving. Describes design features of the containers, gives dimensions of types available. Booklet also describes company's engineering and production facilities. Peters-Dalton, Inc.

VALVES, TRAPS, PIPING AND ACCESSORIES

146 Data on Valves—Catalog 654, 64-pp, shows company's line of needle, globe, plug, relief, and check valves. Points out recent design changes, and describes new items added to the line, including 6000 psi Lo-torq selector valves, 10,000 psi needle valves, adjustable gage snubbers, pilot operated relief valves, and a line of plug valves with Teflon plugs designed for service from -65 to 250 F withiut the need for a lubricant. Complete descriptions, construction details, dimensions, specifications, and ordering instructions given. Republic Mfg. Co.

147 Ball Float Trap—Eight-pp Bulletin 289 describes ball float traps for draining water from air, gas or steam lines or for draining light liquids from gas under pressure. Physical data and prices are given for cast semi-steel and forged steel single lever, "snap-action," compound lever and free-floating lever traps. An orifice capacity chart together with tables of maximum operating pressures on light liquids of various specific gravities is provided. Use of corrosion resistant traps for special jobs is described. Armstrong Machine Works.

Reader Service Cards for ordering bulletins are on pages 199-200. Be sure to include your name, job title, and company.

148 Plastic Pipe, Fittings—How to use and specify rigid plastic pipe and fittings is told in this 12-pp catalog. Provides reference data on a ½- to 4-in. line of normal and high impact unplasticized polyvinyl chloride pipe and fittings, plus properties and characteristics, together with detailed drawings and specifications of solvent-type fittings and injection-molded threaded fittings. Alpha Plastics, Inc.

149 Stainless Tubing and Pipe—Fabricating and working of stainless tubing and pipe is described in this fully illustrated 36-pp bulletin. Eleven types of fabrication are described separately. Helpful hints tell how to design for economical fabrication. A basic section gives fabricating characteristics of ferritic, austenitic and certain specialty steels. Tables provide detailed information on cold bending and coiling both tubing and pipe. The Carpenter Steel Co.

150 Strainers for High, Low Pressure—Bulletin 9-S, 16-pp, contains information on 15 types of strainers for high and low pressure service, including dimension and sizing charts, sectional drawings and descriptive information. Discusses application, design features, and specific operating characteristics and makes a useful reference manual. Schutte and Koerting Co.

151 Forged Steel Unions—Bulletin U-1 describes company's forged steel unions, listing dimensions in sizes ⅛ to 2 in. in 3000 lb class. Design features which make the unions desirable for high pressure service and for resistance to shock, vibration and misalignment stresses are fully described. Watson-Stillman Fittings Div., H. K. Porter Co., Inc.

HEATERS, HEATING

152 Gas-Fired Heaters—Form PB1-54 describes and pictures company's Panelbloc heaters that generate infra-red rays that "heat like the sun." Discusses construction and operation of the heaters, and stresses such advantages as no air blasts, downward radiations, low maintenance. Gives specifications for the heaters which operate on any commercial type of gas fuel. Thermobloc Div., Prat-Daniel Corp.

153 Heating Units—This 20-pp illustrated folder covers the application and installation features of manufacturer's "folded and formed" heating unit and I-shaped refractory porcelains. Shows how the heating elements are available as custom-built racks, jackets for autoclaves and kettles, standard racks. Trent, Inc.

154 Heater Selection Guide—Bulletin GEA-6146 provides a handy selector guide for determining size and type of heaters for various surface heating applications. Shows which type to use for specific jobs, how to determine heater rating, calculate heat-up time, and select thermostats and controls. General Electric Co.

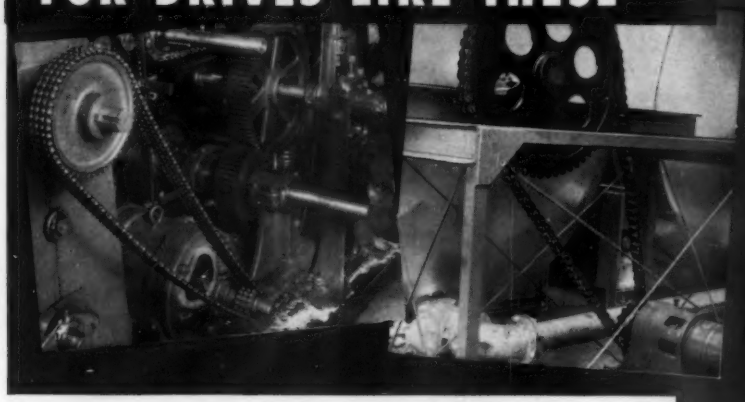
METALS

156 Copper and Copper Alloy—Publication B-34, 24-pp, is a tabbed reference manual containing the latest copper and copper-alloy specifications, including ASTM, ASME, AWS, SAE, AMS, Federal, Military, and other specifications. The index is in two sections—the first lists company's most generally used alloys, together with applicable specifications of the agencies, and the second lists specifications in numeric order with a brief description of the material. The American Brass Co.

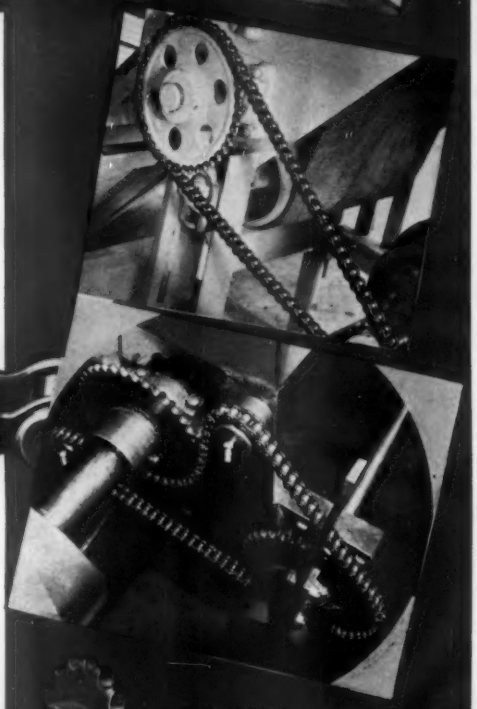
157 On Steel Selection—This 16-pp revised catalog describes two chrome-nickel alloy steels reported capable of handling most alloy jobs . . . a case hardening steel and one which can be either hard- or tough-tempering steel, depending on heat treatment. Complete descriptions of both alloys are given, including type analysis, physical properties, working instructions and stock sizes available. Typical uses are listed. The Carpenter Steel Co.

(More Bulletins on page 201)

FOR DRIVES LIKE THESE···



SELECT DIAMOND ROLLER CHAINS and SPROCKETS *from Stock*



With so wide a range of *stock* Roller Chains and Sprockets now available, drive requirements can be met in the shortest possible time.

Whether the drive center distances are short or long; speeds high, low, or medium; Diamond Roller Chains will do the job. And power transfer, in large or small amounts, presents no problem. New Catalog 754 covering *stock* Chains and Sprockets will help you to the correct selection.

DIAMOND CHAIN COMPANY, Inc.

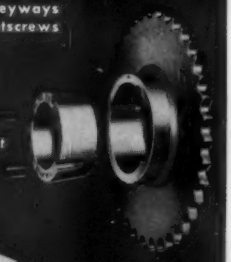
Where High Quality has been Traditional for 65 Years

Dept. 614, 402 Kentucky Avenue, Indianapolis 7, Indiana

Offices and Distributors in All Principal Cities

Please refer to the classified section of your local telephone directory under the heading CHAINS or CHAINS-ROLLER

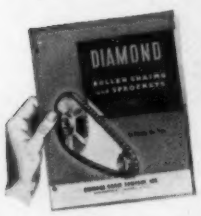
Finished-Bore Sprockets complete with keyways and setscrews



Taper-Lock Sprockets with replaceable bushings to meet wide range of bores

ALWAYS PRELOADED

For many, many years, Diamond Chain has been preloaded after assembly for the purpose of bringing pin-bushing seating into stabilized relationship prior to field installation.



Catalog 754 is Available Now

You will find complete information, helpful illustrations and useable tables on how to select a stock roller chain drive, how to calculate chain length, speed ratios for sprocket combinations; installation recommendations, single and multiple-strand chains—all pitches; flexible chain couplings, double pitch chains, conveyor chains, etc., etc.

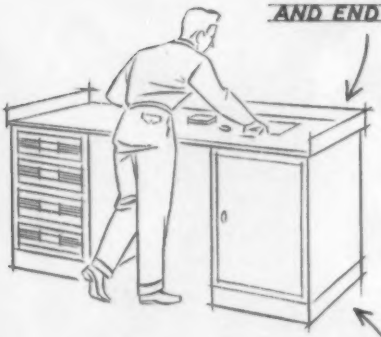
Write for this 64-page Catalog 754 today.

Labeled and Packaged 10′ Lengths of Chain. Reels for 50′ and over.

For more facts circle 518 on Reply Card

HOW TO USE STANDARD HALLOWELL UNIT WORK BENCHES AND ACCESSORIES IN PLANT MODERNIZATION

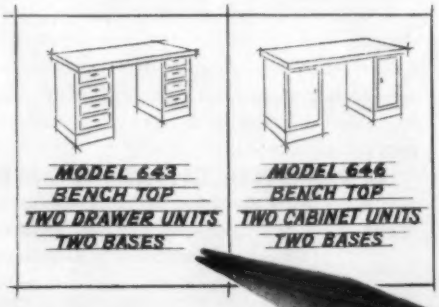
MODEL 640 - BENCH TOP, DRAWER UNIT, CABINET UNIT, TWO BASES



ASSEMBLE THEM IN CONTINUOUS LINE - JOINED IN THE MIDDLE OF THE UNITS OR BUTTED END-TO-END

USE THEM AS INDIVIDUAL BENCHES

4 TOP MATERIALS, 2 LENGTHS, 2 WIDTHS
2 HEIGHTS - ALL STANDARD



MODEL 643
BENCH TOP
TWO DRAWER UNITS
TWO BASES

MODEL 646
BENCH TOP
TWO CABINET UNITS
TWO BASES

Standard Units · Standard Accessories · Sturdy Steel Construction · Stocked by leading Shop Equipment Dealers · Send for "Benchery" - a Humorous Booklet on What You Can Do with Hallowell Benches · Hallowell Shop Equipment Division, Standard Pressed Steel Co., Jenkintown 26, Pa.

HALLOWELL SHOP EQUIPMENT DIVISION

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JENKINTOWN PENNSYLVANIA

BENCHES (CABINET, WORK, UNIT) • STOOLS AND CHAIRS • SHOP DESKS • TOOL STANDS AND CABINETS • DRAWERS, DRAWER TIERS • STEEL CARTS • SHELVING

For more facts circle 519 on Reply Card

"BIG ROCKER"

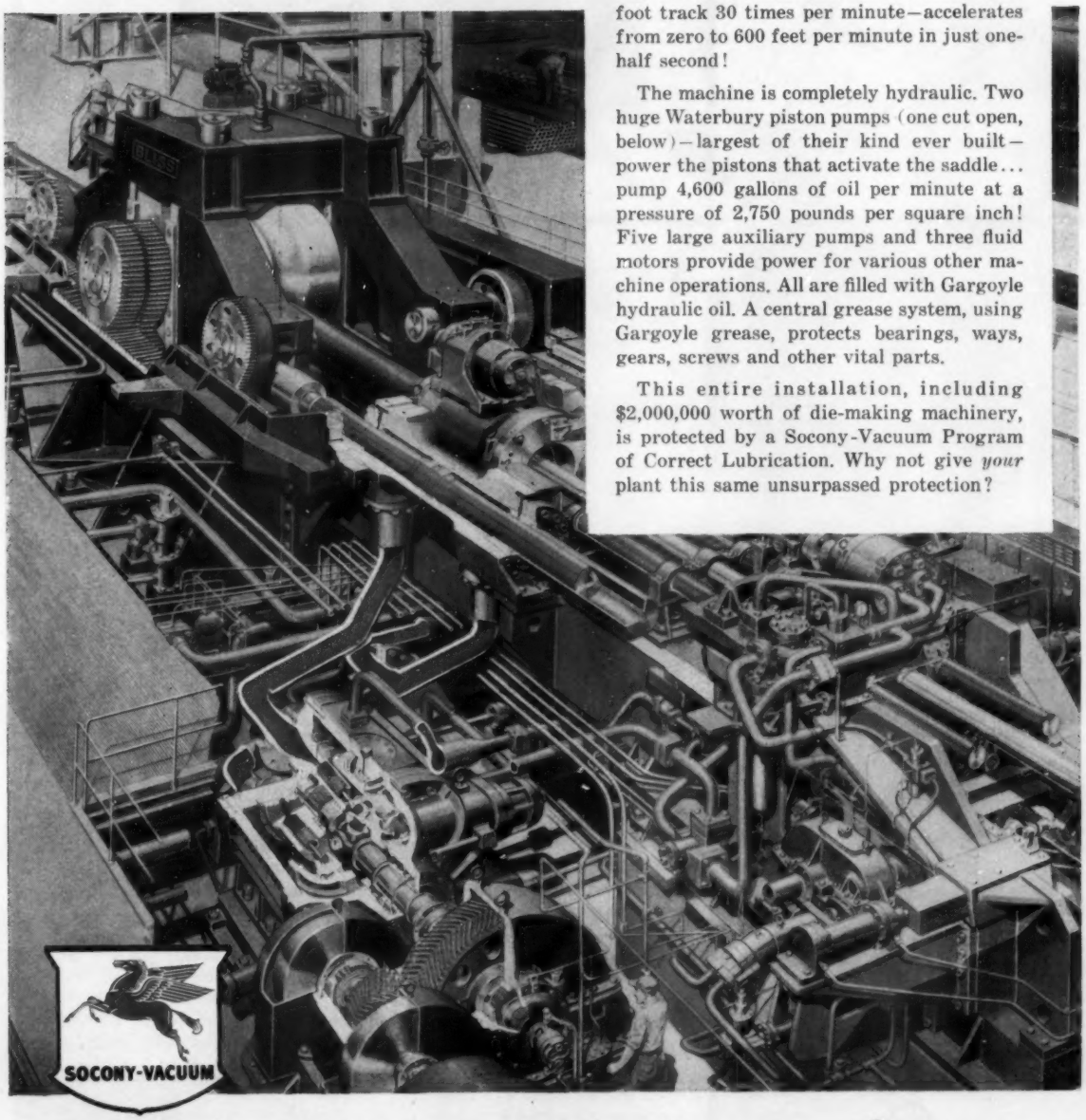
World's Largest Tube Reducing Machine Protected by the World's Greatest Lubrication Knowledge

It's 100 feet long, three stories high, weighs 675 tons! It's the world's largest tube reducing machine, built by E. W. Bliss Co., for the Tube Reducing Corp., Wallington, N. J. This giant takes rough, 18-inch O. D. cold steel tubing and reduces it to between 17- and 9-inch tubing. Finished tolerances are precise.

Heart of the Big Rocker is the "saddle" (top) which holds the huge dies that shape and stretch the tubing. This saddle, weighing 152 tons, rocks back and forth on a six-foot track 30 times per minute—accelerates from zero to 600 feet per minute in just one-half second!

The machine is completely hydraulic. Two huge Waterbury piston pumps (one cut open, below)—largest of their kind ever built—power the pistons that activate the saddle... pump 4,600 gallons of oil per minute at a pressure of 2,750 pounds per square inch! Five large auxiliary pumps and three fluid motors provide power for various other machine operations. All are filled with Gargoyle hydraulic oil. A central grease system, using Gargoyle grease, protects bearings, ways, gears, screws and other vital parts.

This entire installation, including $2,000,000 worth of die-making machinery, is protected by a Socony-Vacuum Program of Correct Lubrication. Why not give *your* plant this same unsurpassed protection?



SOCONY-VACUUM *Correct Lubrication*

FIRST STEP IN CUTTING COSTS

SOCONY-VACUUM OIL COMPANY, INC., and Affiliates: MAGNOLIA PETROLEUM COMPANY, GENERAL PETROLEUM CORPORATION

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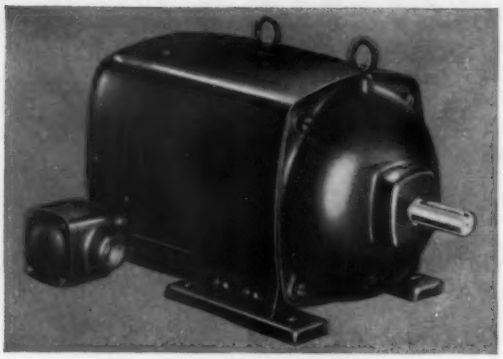

Leland Type PA, Polyphase, Explosion-proof (Underwriters' Approved, Class I, Group D), Externally fan cooled, Ball bearing, Integral HP

LELAND never cuts corners

There are many different ways to build an electric motor — drip-proof, totally enclosed, explosion-proof. . . .

Basically, however, there are only two. To meet necessary specifications. Or to build it as though you yourself were the end user . . . to build it as you know it *ought* to be built.

Leland, since its very beginning, has built motors this second way.

Every Leland is made of the finest materials available consistent with user economy. Every Leland is designed to be better than it *has* to be.

It's no way to get rich quick. But it has proved to be good business. And it's a firm policy the proud engineers and craftsmen of Leland will continue to pursue.

Investigate the value of this policy to *you*. Leland manufactures a complete line of motors from 1/6 to 5 horsepower, in all of the standard types and enclosures.

Leland Type KL, Capacitor start, Induction run, Drip-proof, Sleeve bearing, 1/6, 1/4, or 1/3 HP

Another AMF Product

LELAND MOTORS

Write us today.
THE LELAND ELECTRIC COMPANY, Division of American Machine & Foundry Company, Dayton 1, Ohio

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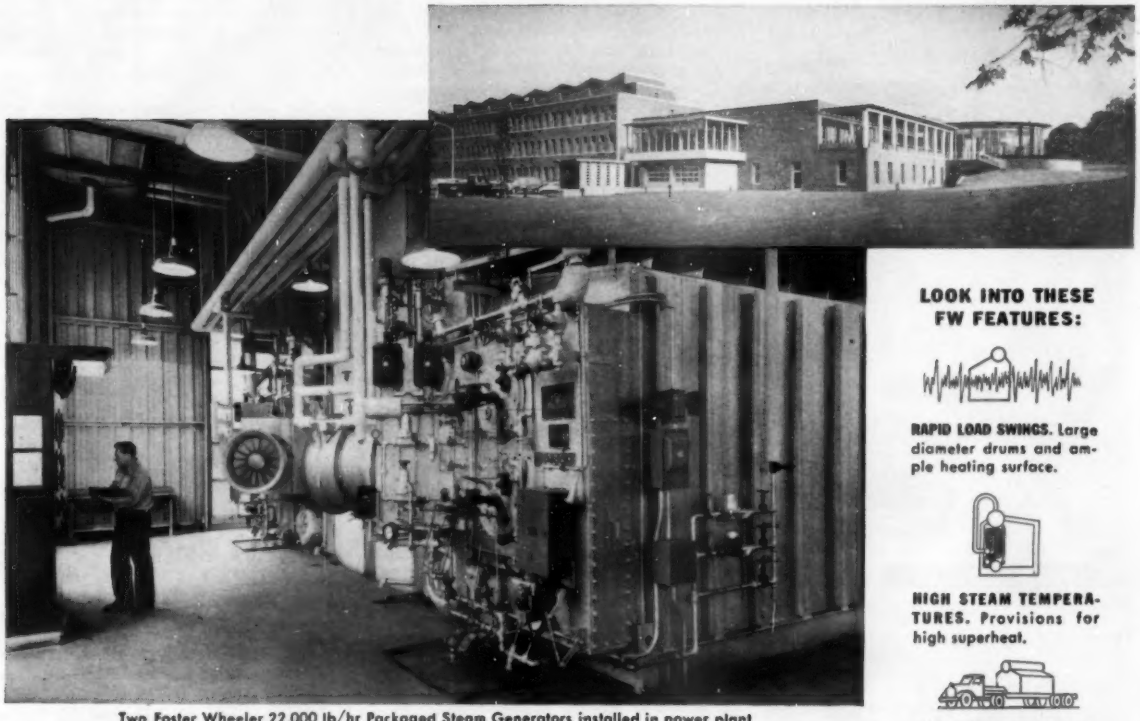
two FW packaged steam generators add up to LOW POWER-PLANT COSTS at new IBM laboratory

TRADE MARK



Two Foster Wheeler 22,000 lb/hr Packaged Steam Generators installed in power plant of new IBM research laboratory at Poughkeepsie, N. Y.

International Business Machines Corporation's new research laboratory at Poughkeepsie, N. Y. is designed for maximum efficiency and dependability of all building services. For low power-plant costs two Foster Wheeler packaged steam generators were chosen.

On actual test, each of these new boilers has produced in excess of the guaranteed capacity of 22,000 lb of steam per hour at 125 psig operating pressure. They will supply the heating load for the entire building, as well as power for the steam-turbine-driven refrigeration plant.

Compared to conventional boiler construction, these standard-design, plant-assembled water tube steam generators effect substantial savings in power plant costs. The high efficiency and easy accessibility of the Foster Wheeler design contribute to low operating and maintenance costs, thus, as in this installation, justifying the use of multiple units.

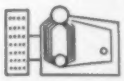
Foster Wheeler Packaged Steam Generators are available in capacities up to 45,000 lb of steam per hour; final steam temperatures to 825 F; pressures to 900 psig. For complete information, write to *Foster Wheeler Corporation, 165 Broadway, New York 6, N. Y.*

LOOK INTO THESE FW FEATURES:

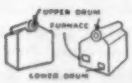
RAPID LOAD SWINGS. Large diameter drums and ample heating surface.

HIGH STEAM TEMPERATURES. Provisions for high superheat.

ADAPTABILITY. Easily moved. Require only a slab foundation — permit outdoor installation.



ECONOMIZERS. Package economizers available to increase capacity and minimize fuel cost.



ACCESSIBILITY. For inspection, cleaning and maintenance.

CLEAN HEATING SURFACES. Soot blowers incorporated . . . cleaning without boiler shutdown.

FOSTER WHEELER

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CHEMPRO
makes them all in Teflon!

RING TYPE PACKINGS

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FLEXIBLE SEAL CAGES

JACKETED GASKETS

SOLID RING GASKETS

CHEMICAL & POWER PRODUCTS, INC.
7 Broadway, New York 4, N.Y.

Check the Bulletins you want:

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- ☐ Gaskets
- ☐ Teflon Stock & Special Molded and Machined Parts

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BACKTALK about our past issues

Edited by R. L. Marinello

PE Automation Reference Source

PLANT ENGINEERING:

"We are in the process of preparing course material in the field of automation work with the hope of developing courses for advanced engineering students and plant personnel.

"I have had an opportunity to use your magazine in the past and find it an excellent reference source for this particular problem." *S. Linsky, Assistant Professor, Department of Industrial Engineering, The Pennsylvania State University, State College, Pennsylvania.*

Repairing Pipe With Resin

PLANT ENGINEERING:

"Having read your interesting article on 'Corroded Pipe Trouble' in the January, 1955, issue of your magazine, I would appreciate it very much if you could send me further information on Celanese MR28C Resin for repairing pipes." *D. Scouler, Jr., Plant Engineer, Halifax Shipyards Limited, Halifax, Nova Scotia, Canada.*

PLANT ENGINEERING:

"We would appreciate further information on the resin mentioned in the January article. We would also like to obtain sample materials and costs in order that we may evaluate the use of this resin in mending equipment in our plant." *Anthony Casciaro, Chemist, Rainfair, Inc., Racine, Wisconsin.*

▶ Your requests have been forwarded to Mr. Gil Stanley, Celanese Corporation of America, 180 Madison Ave., New York, N. Y., who will see that additional information is sent to you.—*Editors.*

Can You Help This Reader?

PLANT ENGINEERING:

"In your June, 1954 issue I read the article entitled 'How to Water-Down Industrial Odors' by H. Nye Josleyn. The particular system which he outlined in this article is not compatible with the problem in our mill.

"We are a manufacturer and operate a large cotton knit bleaching process. We produce approximately 160,000 lb of bleached cloth each week. This cloth is bleached through a peroxide bleach range. Included in our waste water are cotton lint particles, caustic soda, silicate of soda and hydrogen peroxide along with a very small amount of optical dye. We have to drain this waste water off into a lagoon which has been built by us and which has been recommended by the State of Kentucky Health Board, but we find now that there is such a disagreeable odor thrown off from this lagoon that many of our neighbors and residents nearby are complaining.

"If you have any information concerning this particular problem of ours or if Mr. Josleyn has come into contact with a similar problem, we would appreciate very much hearing how we can cope with this disagreeable odor.

"Our waste water goes into the lagoon at a temperature of about 100 F and, of course, in the winter time when this hot waste water hits the lagoon which is cooler it creates quite a dense fog." *William E. Baxter, Union Underwear Co., Inc., Campbellsville, Kentucky.*

▶ We are forwarding a copy of your letter to the author, H. Nye Josleyn, and possibly he may have some suggestions to help you solve this problem. If other readers have been confronted with such a situation and can offer Mr. Baxter some assistance, he will be happy to hear from you.—*Editors.*

Rubber RR Crossing

PLANT ENGINEERING:

"On page 118 of the January, 1955, edition of PLANT ENGINEERING there is an article on a rubber roadway at a railway crossing which was evidently developed by Goodyear Tire and Rubber Co.

"We are interested in receiving further information on such a crossing and would, therefore, appreciate your advising us where to contact this company for additional data on this type of material." *J. A. Quinn, Purchasing Agent, Fireboard Products, Inc., Stockton, Calif.*

▶ To expedite your receipt of this information, we have taken the liberty of contacting W. C. Calhoun, Operating Manager of the West Coast office of Goodyear's Industrial Products Division, 6666 East Washington Blvd., Los Angeles, California, and have asked him to contact you.—*Editors.*

Seeks Facts about Court Case

PLANT ENGINEERING:

"In the October, 1954, issue of PLANT ENGINEERING, there was an article in the 'Court Decisions' series entitled 'Fumes from Dye Works' which gave a very interesting account of the court contest of an injunction prohibiting the discharge of black smoke, soot and fumes from a dye plant in a Pennsylvania city.

"We have had some nuisance suits filed

BETZ • *A Great Name In Water Conditioning*

we're from Missouri...

. . . and for good reason!

Betz Water Conditioning Service is based on the policy that nothing is left to chance. There are no mere guesses or assumptions that conditions are satisfactory at a client's plant.

In addition to regular visits by Betz Engineers and daily water testing by plant personnel, we "double-check" results by means of more complete analyses in our own laboratories.

At regular intervals, water samples from important points throughout the plant system are secured by our engineers and forwarded to our modern laboratories. Here, experienced chemists analyze each sample until it literally breaks down and "admits the facts".

Such painstaking analyses often reveal conditions which may not be evident from plant control tests. It permits our Engineering Division to make corrective recommendations *well in advance*, thereby heading off any serious trouble which might develop. This, too, is *another* important part of Betz *completely-integrated* water conditioning service.

W. H. & L. D. BETZ, Gillingham & Worth Streets, Philadelphia 24, Pa.

In Canada: BETZ Laboratories Limited, Montreal 1.

BETZ

CONSULTANTS ON INDUSTRIAL WATER PROBLEMS

NEW HOIST BOOSTS PRODUCTION ECONOMY

Here is the Series "600" 'Load Lifter'—the new heavy-duty electric hoist for loads up to 1 ton. Power and durability; safety-first construction; wire rope and push-button control; push type trolley, hook, and lug suspensions—all interchangeable—help make the Series "600" 'Load Lifter' a big money-saver wherever tough small load handling is vital to production lifting.

Special aluminum alloy frame and covers combine lightness with great strength and shock resistance. Motor and controller are heavy-duty type. 24 volts at the push button for extra safety. Accurate load control with double braking system. Capacities: ½ and 1 ton. Get complete details about the new Series "600" 'Load Lifter' from your nearby "Shaw-Box" distributor or write for Bulletin 408.

'Load Lifter'®

ELECTRIC HOISTS

MANNING, MAXWELL & MOORE, INC.

MUSKEGON, MICHIGAN

Builders of "Shaw-Box" and 'Load Lifter' Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties. Makers of 'Ashcroft' Gauges, 'Hancock' Valves, 'Consolidated' Safety and Relief Valves, 'American' and 'American-Microsen' Industrial Instruments, and Aircraft Products.

For more facts circle 525 on Reply Card

BACKTALK

against us and we would like to get in touch with the company who was enjoined by the injunction proceedings." *T. J. Stewart, Works Manager, C. K. Williams & Co., East St. Louis, Illinois.*

▶ We no longer have this reference in our files, but are asking Mr. Albert Woodruff Gray, who prepared this material, to send you the necessary data and any other court cases he may know of which would interest you.—*Editors.*

Rotary Pump Articles

PLANT ENGINEERING:

"We would very much like to receive a tear sheet of the two-part article 'Rotary Pumps—Types and Applications.'

"Part I of this article appears in the October, 1954, issue." *J. E. Parker, Carbide and Carbon Chemicals Co., Division of Union Carbide and Carbon Chemicals Corp., Texas City, Texas.*

▶ The second part of this article appeared in our November issue. We are sending you both parts with our compliments.—*Editors.*

Battery Training Manual

PLANT ENGINEERING:

"In reading your January, 1955 issue, we came across the article 'Battery Care and Maintenance in Ten Easy Lessons' which mentions the booklet put out by Gould-National Batteries, Inc.

"It would be of great assistance to our Plant Engineering Department, and we would appreciate your furnishing the undersigned with a copy of the booklet." *C. J. Rodgers, Plant Engineer, Warner-Hudnut, Inc., New York, N. Y.*

▶ Your request, along with the many others we have received, is being forwarded to Mr. James McCullough of Gould-National Batteries, Inc., and he will see that the booklet is sent to your attention.—*Editors.*

Series on Track Maintenance

PLANT ENGINEERING:

"We have enjoyed the third section of 'Industrial Railroad Trackage—Maintenance of Rail and Rail Joint Bars' in the December, 1954, issue of PLANT ENGINEERING and would like reprints of the preceding two articles." *R. H. Howard, Assistant Plant Engineer, Dunlop Tire and Rubber Corp., Buffalo, New York.*

▶ We are sending you the complete series of articles on Industrial Railroad Trackage, including the fourth part which appeared in January, 1955.—*Editors.*

Photography Aids Assemblers

PLANT ENGINEERING:

"Your December, 1954, issue has a most interesting article on page 46 of the 'Operation and Production' section, referring to the use of color transparencies as an assembly line aid.

"We are desirous of discussing this improvement in greater detail with the Bell Aircraft Engineers. Is it possible for you to furnish us with name of the individual and electronic department section unit who might be contacted directly?" *J. W. Baum, Production Engineering Department, Sonotone Corp., Elmsford, New York.*

▶ Our original material came from James J. Clarke in the Public Relations Department of Bell Aircraft Corp., Buffalo, New York, and we have written to him asking that he send you complete information on the transparencies. We have also asked him to send you the name or names of engineers with whom you can correspond.—*Editors.*

Query on Cylinder Sizes, Etc.

PLANT ENGINEERING:

"We have noticed in your October, 1954 issue of PLANT ENGINEERING, page 60, and article on 'What Size Cylinder Do You Need?'

"We are considering building a portable fire fighting hand truck, on which we are mounting a 55 gal water tank. We would like to know what pressure and what size cylinder we would need to maintain 80 to 90 lb to empty tank through a ¾ in. hose with about a ¼ in. nozzle. Also what size regulator would be needed?

"We would also like to know what type of gas would be best and where can the tanks and gas be purchased?" *C. J. Dicken, Chief Electrician, Owens-Illinois Glass Co., Fairmont, W. Va.*

▶ A copy of your letter is being forwarded to A. Kiczales, of Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y., and he will see that it is turned over to the appropriate person for reply.—*Editors.*

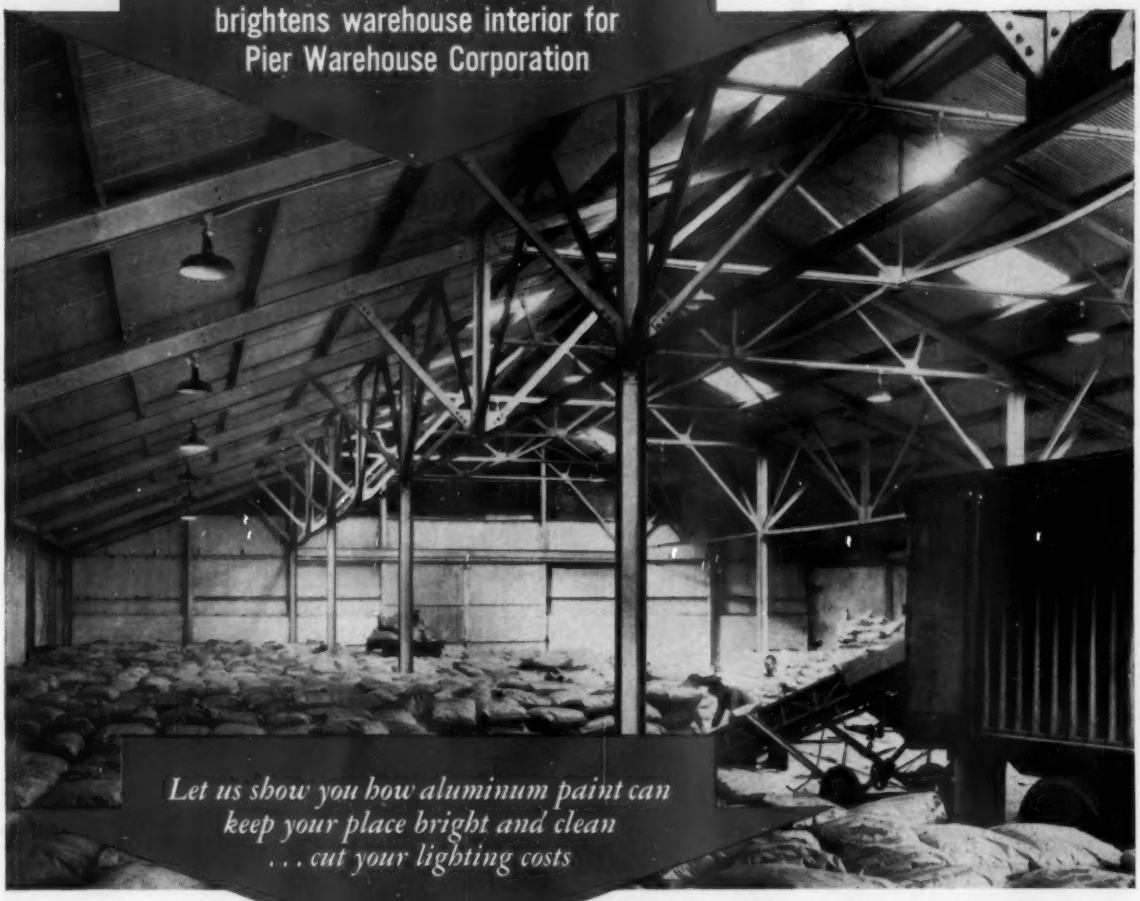
Interested in Surface Seal

PLANT ENGINEERING:

"Your November, 1954 issue of PLANT ENGINEERING mentioned a product called Safe-T-Seal which aroused the interest of one of our engineers.

"Please arrange to have descriptive literature mailed to us marked for the attention of the writer." *C. H. Wolff, District Purchasing Agent, Aluminum Company of America, Rosiclare, Illinois.*

Debevoise Aluminum Paint
brightens warehouse interior for Pier Warehouse Corporation



Pier Warehouse Corporation Terminal, foot of 20th Street, Brooklyn, N.Y.
Aluminum Paint: Debevoise Company, Brooklyn, N.Y.

Pier Warehouse Corp. had the problem of providing efficient lighting in these windowless warehouses. In order to make the most of the limited natural light provided by a few small skylights, aluminum paint was selected for its high light reflectivity. It was used on all structural steel trusses, columns, walls and ceilings. Now the once-dark warehouses are pleasantly bright and clean, as the photograph shows.

Besides finding that aluminum paint has "very fine refraction for light" which gave the warehouses a cleaner appearance, the superintendent of construction, Andrew J. Honor, stated that it has good preservative qualities, especially in this corrosive waterfront area. "It is economical, too," he said. "One coat is all that is necessary, yet it costs about what we would have to pay for any other type of paint." Moreover, aluminum paint was found to have a very fine surface spread, permitting quick, easy application.

Aluminum paint's durability and high reflectivity make it the ideal coating for uses such as this where good visibility and corrosion resistance are essential. Let us tell you more about the outstanding advantages you get with aluminum paint. Write today for the FREE BOOKLET, *Painting With Aluminum.*

ALCOA **ALUMINUM**

ALUMINUM COMPANY OF AMERICA

Paint Service Bureau, Aluminum Company of America
1790-C Alcoa Building, Pittsburgh 19, Pennsylvania
Please send me your FREE BOOKLET, *Painting with Aluminum.*

I plan to paint_____

Name_____

Company_____

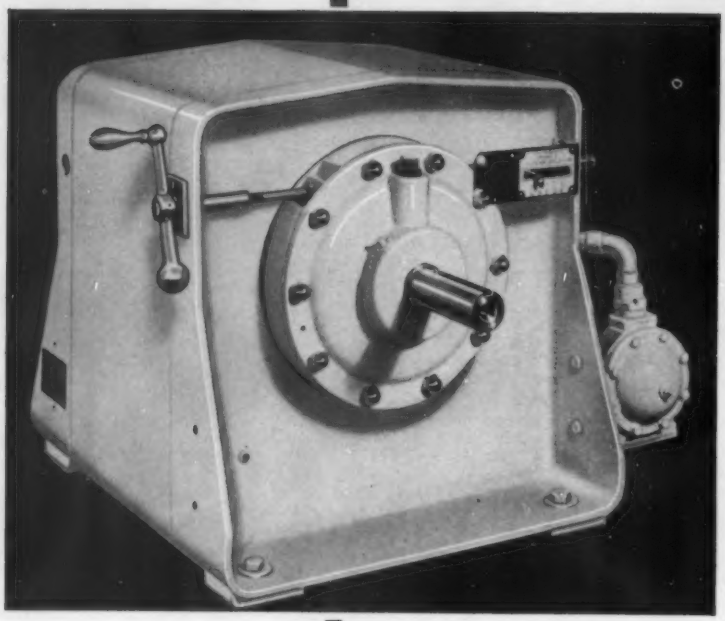
Address_____

City_____ Zone____ State_____

For more facts circle 526 on Reply Card

American Blower Gýrol Fluid Drives offer you

Adjustable speed over a 5 to 1 speed range



Think of the power and maintenance savings you'd gain from your equipment if you could eliminate special motors and expensive starting controls, yet still have an adjustable speed drive with a wide speed range.

You get this advantage with American Blower Gýrol Fluid Drives — plus the additional benefits of no-load starting, shock absorption, automatic or manual acceleration control and quiet operation.

The standard Gýrol Fluid Drive line includes constant-speed and adjustable-speed units — from fractional horsepower to 12,000 hp and speeds to 3600 rpm. Your nearest American Blower Branch Office has full information. Why not give them a call.

Typical Applications

PUMPS, AGITATORS, MIXERS
CONVEYORS, CABLE & ROPE MACH'Y
FANS AND BLOWERS
CENTRIFUGAL COMPRESSORS
PAPER AND PRINTING MACH'Y
TEXTILE MACH'Y

Principle of operation of Gýrol Fluid Drives

Runner Vortex of Oil Impeller

Operates on hydro-kinetic principle, using vortex of oil to transmit power from driving to driven machinery. Power is transmitted smoothly, evenly, efficiently without shock. Fluid Drive provides a simplicity of design and a flexibility of operation no other method of power transmission offers – plus an inherent safety factor.

American Blower products serve industry

- AIR CONDITIONING, HEATING, VENTILATING EQUIPMENT
- MECHANICAL DRAFT EQUIPMENT
- INDUSTRIAL FANS AND BLOWERS
- CENTRIFUGAL COMPRESSORS
- GÝROL FLUID DRIVES
- DUST COLLECTORS

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Division of American Radiator & Standard Sanitary Corporation

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Serving home and industry: AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS & WALL TILE
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For more facts circle 528 on Reply Card

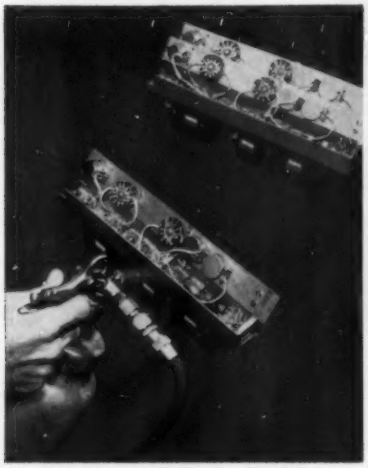
DOW CORNING CORPORATION

Silicone News

PRODUCTION & MAINTENANCE EDITION No. 5

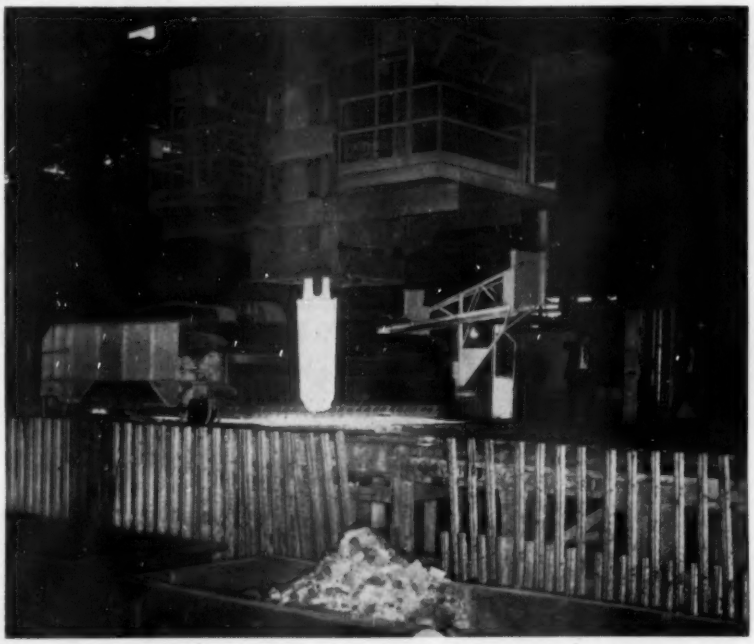
Silicone Fluid Reduces Maintenance; Protects Sensitive Electronic Devices

Severe moisture conditions often encountered by oil field exploration teams can play hob with their sensitive seismographs. Although all critical components such as resistors and capacitors are usually vacuum dried and enclosed in hermetically sealed cans, moisture condensation on the can terminals may render the device inoperable until it has been thoroughly dried and cleaned.



Southwestern Industrial Electronics of Houston, the largest manufacturer of oil field exploration seismographs, solves that problem by spraying terminals, plug strips and other exposed connections with Dow Corning 200 Fluid. A regular production

(Continued on pg. 2)



SILICONE GREASE ELIMINATES BEARING FAILURE; PREVENTS DELAY IN VITAL STEEL MILL OPERATION

At Rotary Electric Steel in Detroit, removing heavy steel refractory covers from soaking pits was frequently a source of delay. The pits, used to preheat steel ingots for the blooming mill, operate at temperatures from 1800 to 2350 F. When an ingot is placed in the pit or is ready for removal, an electric carriage rolls over the pit, hoists the cover and trundles it to one side or the other.

In raising the pit covers all four wheels are indirectly exposed to the intense heat. No matter which way the carriage moves, two of the wheels are almost directly exposed to heat. Despite almost continuous lubrication with organic greases, the tapered and plain roller bearings frequently seized. If this happened when a charge was in danger of overheating, the carriage had to be dragged away by two cranes.

In 1949 after trying the most heat-resistant organic greases, Rotary production men tested Dow Corning 41 Silicone Grease in the wheel bearings. Noting an immediate reduction in failures, they changed over to this heat-stable silicone lubricant for all vital carriage bearings. Applied once a week, Dow Corning 41 has kept the carriages rolling 24 hours a day, 365 days a year, for over 5 years without a single bearing failure. ***No. 44***

Transformer Buyers Specify Silicone Insulation for Greater Safety

Safety conscious plant planners are swinging to silicone insulated, nitrogen-filled transformers for greater protection against fires and explosions. New evidence of this growing trend is the order for over three hundred 30 KVA, 3 phase, dry-type units recently received by Moloney Electric Company of St. Louis. Designed for lighting and small motor service, these transformers are completely insulated with silicone materials to withstand abnormally high ambient or overload temperatures. ***No. 45***

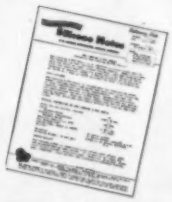
FOR DATA RELATING TO THESE ARTICLES, CIRCLE REFERENCE NUMBER IN COUPON ON NEXT PAGE

MORE

DOW CORNING CORPORATION

Silicone News

DOW CORNING PUBLICATIONS ON NEW DEVELOPMENTS AND TECHNICAL DATA . . . .



1955 Reference Guide to Dow Corning silicone products packs into 8 pages a brief but comprehensive summary of the properties and applications of the silicone products that are most widely used. Products are indexed by type of application. With increasing importance placed on cost reduction and product improvement, a reference guide to these remarkably stable engineering materials becomes more essential to production and maintenance engineers. *No. 49*

"New Developments in Silicones" is a 16-page progress report which appeared in a recent issue of MACHINE DESIGN. A complete review of the most useful silicone products, the article provides data and illustrates applications for silicone foams, protective coatings, rigid laminates, dielectrics, lubricants, rubber and adhesives. Reprints available. *No. 50*

Dow Corning 36 Emulsion is a completely new silicone mold lubricant. Much more stable than any comparable silicone emulsion, it gives molded parts a superior surface finish. Its stability is attributable to an average particle size of less than 0.5 microns. At concentrations in the range of 1 part emulsion to 100-200 parts water, Dow Corning 36 Emulsion gives clean, easy release of rubber or plastic moldings and cast metal parts. *No. 51*

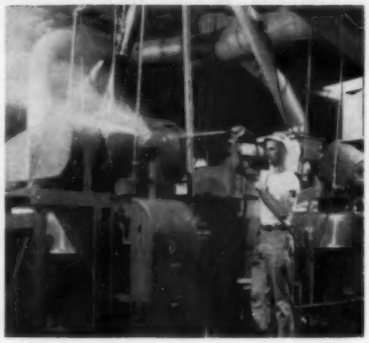
Dow Corning 6 Compound, a grease-like nonhardening, rust preventative for ferrous alloy metal parts in delicate mechanisms and fine instruments, provides excellent protection during long time indoor or outdoor storage. *No. 52*

Motor Repair Shops, featuring Class H Insulation made with Dow Corning silicones, are conveniently located in or near most industrial centers. Write for copy of recently revised listing which includes more than 200 such repair shops in 35 states. *No. 53*

Dow Corning Antifoam A, recognized as a most effective defoamer for a wide variety of aqueous and nonaqueous systems, is now available from laboratory supply houses in convenient spray bomb dispensers. Combined with a volatile Freon propellent, Antifoam A Spray quickly and economically controls foams in many batch processes. *No. 54*

Silicone Insulation Eliminates Motor Failure Due to Moisture

The exceptional cleanliness of the Gerber Baby Food plant in Fremont, Michigan, is especially noticeable in the section where fruits and vegetables are peeled, cored, strained and mixed for cooking. All machines, motors and floors in the area are hosed with high pressure water at least twice each day. And whenever food is spilled, even slight amounts, the water hose is brought into use again.



Such emphasis on cleanliness is tough on Class A or B motors as Gerber's production and maintenance men learned. In fact, their failure rate was unusually high because the motors, ranging in size from 3 to 30 hp, included several open frames.

Two years ago, in an effort to reduce motor failures, Gerber ordered the most troublesome unit rewound with insulation made with Dow Corning silicones. Performance was so satisfactory that at least 11 more motors have been given the same silicone protection. All of these silicone insulated motors are still in service, still immune to that generally ruinous combination of heat and moisture. *No. 47*

Silicone Paint Gives Long Service on Foundry Furnaces at 650 F

Expose a straight silicone paint to surface temperatures in the range of 650 F for 10 hours a day and it remains in excellent condition almost indefinitely. Under the same conditions, good, high temperature organic paints soon blister and peel, frequently within hours after application.

That has been the experience of maintenance men at the Saginaw Bearing Co. of Saginaw, Michigan, in testing various paints on their bronze-melting furnaces. Six months ago, after wire brushing a furnace to bare metal, they brushed on a single coat of straight silicone-aluminum paint. Cured in service, the coating is still in near-perfect condition. Compare its appearance in the photo foreground with that of the second furnace which was recoated with organic paints dozens of times during the past six months. *No. 48*

SILICONE FLUIDS *(Continued)*

procedure since 1950, this silicone fluid treatment has practically eliminated moisture condensation troubles. Maintenance has been reduced to a series of routine service checks.

In one instance a silicone treated amplifier was accidentally dropped into the Gulf of Mexico. When recovered, the unit was opened, air-dried and put back into service. Several months later when it was reopened, the terminals, cans, wires and other components were found to be heavily encrusted with salt. But, thanks to that thin film of Dow Corning 200 Fluid, the entire system still functioned correctly. *No. 46*

Dow Corning Corporation, Dept. 0503, Midland, Michigan

Please send me: 44 45 46 47 48 49 50 51 52 53 54

NAME _____

TITLE _____

COMPANY _____

STREET _____

CITY _____ ZONE____ STATE_____

SILICONE NEWS is published for production and maintenance men by

DOW CORNING CORPORATION

MIDLAND MICHIGAN

first in silicones

DOW CORNING SILICONES

ATLANTA CHICAGO CLEVELAND DALLAS DETROIT LOS ANGELES NEW YORK WASHINGTON, D.C. (SILVER SPRING, MD.)

CANADA: DOW CORNING SILICONES LTD., TORONTO ENGLAND: MIDLAND SILICONES LTD., LONDON FRANCE: ST. GOBAIN, PARIS

They voted LYON 5 TO 1

Key executives of companies throughout the country have voted 5 to 1 for Lyon! They have given Lyon more first choice mentions than the next thirteen manufacturers combined!

A nationally known research company compiled those figures when they asked key men in 5,000 companies this question:

"If your company were in the market for steel equipment such as steel shelving, lockers, work benches, shop boxes, etc., what manufacturers would you consider?"

Your nearest Lyon Dealer offers the world's *most diversified* and *most preferred* line of quality steel equipment. (A few are shown below.) Equally important, he can show you how to get the most out of steel equipment in terms of time, space and money.

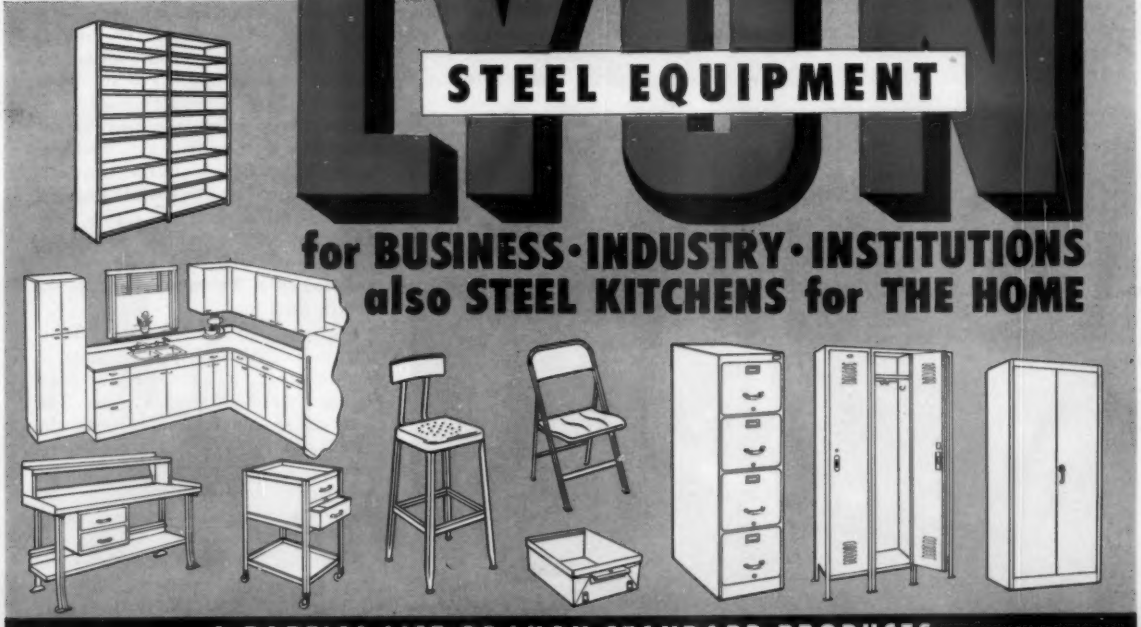
LYON METAL PRODUCTS, INC.
General Offices: 391 Monroe Ave., Aurora, Ill.
Factories in Aurora, Ill. and York, Pa.
Dealers and Branches in All Principal Cities

Lyon also has complete facilities for manufacturing special items to your specifications.

LYON®

STEEL EQUIPMENT

for BUSINESS • INDUSTRY • INSTITUTIONS
also STEEL KITCHENS for THE HOME



A PARTIAL LIST OF LYON STANDARD PRODUCTS

• Shelving	• Kitchen Cabinets	• Tool Toters	• New Freedom Kitchens	• Flat Drawer Files	• Folding Chairs	• Service Carts	• Tool Stands
• Lockers	• Cabinet Benches	• Bar Racks	• Display Equipment	• Revolving Bins	• Coat Racks	• Sorting Files	• Shop Boxes
• Stools	• Storage Cabinets	• Tool Boxes	• Toolroom Equipment	• Filing Cabinets	• Work Benches	• Drawer Units	• Tool Trays
• Bin Units	• Drawing Tables	• Parts Cases	• Wood Working Benches	• Hanging Cabinets	• Bench Drawers	• Hopper Bins	• Shop Desks

For more facts circle 529 on Reply Card

←For more facts circle 528 on Reply Card

PLANT ENGINEERS' DIGEST so those who rush may read and know what's new

Edited by M. E. Weissman

Reconditioning— When Is it Economical?

MANY INGENIOUS methods of rehabilitating worn tractor parts have been practiced in recent years. Some have proved both practical and economical, while others are expensive and not advisable.

Etching and raising the ridge in worn cylinder liners, using wide top compression rings on worn pistons, and installing valve seat inserts in cylinder heads are usual salvage practices on engine parts. Hard facing cutting edges and bucket teeth, straightening sheet metal guards and hoods, and using electric weld to build up worn spots on heavy fabricated steel parts are also economical operations.

Building up track grousers, track rollers, idlers and sprockets and regrinding track roller shafts using undersize bushings, have also proved practical and worthwhile as have welding new rims on sprockets and repairing cracked cylinder heads.

If a part can be reconditioned for less than the cost of a new part, and has a life expectancy approaching that of a new part, reconditioning is recommended. Many times however, the purchase of new parts will prove more satisfactory than reconditioning.

Advisability of building up track links with electric welding rod is questionable.

Reconditioning fuel injection pumps and regrinding crankshafts to intermediate undersizes are two other procedures not advised.

Repair of fuel injection pumps frequently results in inaccurate fuel injection timing because of variations in dimensions of fuel pump bodies. Compensation is rarely made during repair for these variations and, although discrepancies in timing are usually not great enough to cause engine malfunction, cost of increased fuel consumption can nullify the original savings. Pumps should be replaced by new, only when they are worn sufficiently to cause hard start-

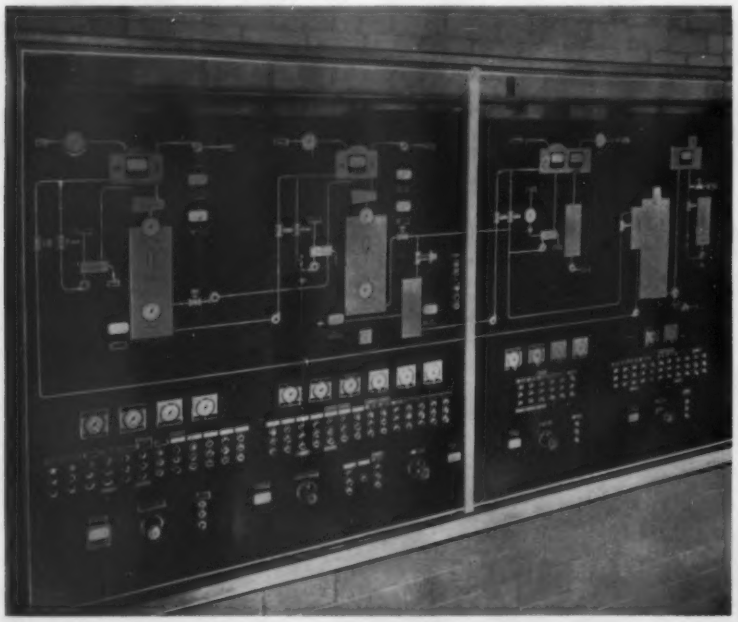
(Continued on page 38)

Installing seat valve inserts on cylinder heads is common salvage practice

Bleach Plant Operations Controlled from Central Point with Aid of Graphic Panel

ONE-MAN CONTROL of its entire bleaching operation has been accomplished at the plant of Marathon Corporation, Oswego, N. Y., by the installation of a schematic flow diagram control panel.

To promote clarity, flow lines, marked in gray on the black board, were widely spaced; indicating lights and meters only were used in the graphic section. Control units were mounted separately from diagram.



Part of graphic panel which is central control point for entire bleach process

The need for operating manuals was reduced by the use of push-button and controller nameplates, numbered and color-coded. Nameplates were located at each operating station where the operator must be advised of any additional functions to be performed.

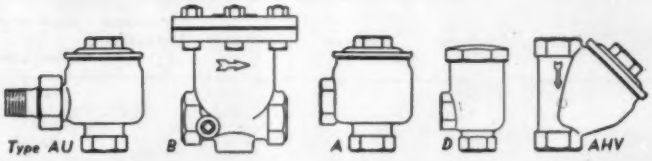
Three basic colors were used for the nameplates, corresponding to the three stages of operation. Large numerals were also used to identify all stations. Signal lights of different colors indicate whether or not pumps and valves are energized, and color coding of the flow network indicates the type of fluid in each line.

The panel, built in our Panel Division, is located behind plate glass in one wall of a fully enclosed room on the top floor of the bleach plant. The room is pressurized to prevent the entrance of chlorine and other fumes, and is also temperature and humidity controlled. For safety reasons, no steam, water or chemicals are piped into the panel area.

From this central point, the operator can start and supervise the complete process, and make any adjustments necessary. Variables for the process can be correlated and the operation easily controlled. *From Instrumentation, published by Minneapolis Honeywell Regulator Company, Industrial Division, Philadelphia, Pa.*

NICHOLSON Steam Traps'

1. Initial Cost
2. Upkeep Expense
3. Warm-Up Time
4. Production Time



SIX TYPES FOR EVERY PROCESS, HEAT, POWER USE

¼" to 2" sizes for pressures from vacuum to 300 lbs. Bronze, monel or stainless steel bellows. Bronze, semi-steel or cast steel bodies.

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Sales and Engineering Offices in 53 Principal Cities

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PLANT ENGINEERS' DIGEST

(Digest begins on page 36)

ing or any noticeable lack of power.

In the case of shafts, it is recommended that the shaft be used until it is worn sufficiently to be reground to standard undersize. Regrinding before the crankshaft reaches this point is an unnecessary expense and requires additional labor in the special fitting of bearings. *From a release of Caterpillar Tractor Co., Peoria, Ill.*

Vacuum System Promotes Safety

PROCESSING 50 tons of cork daily, for the manufacture of bottle caps, produces a considerable amount of highly combustible cork dust at the Bond Crown and Cork Company, Wilmington, Del.

In addition to dust collectors for individual machines, the company has a carefully scheduled housekeeping program, using a central vacuum cleaning system, to keep the dust concentration at a safe level. This system consists of a motor-driven exhauster, a circuit of metal piping that carries the vacuum through the plant, and a set of separators installed where the dust is collected for disposal.

Operator plugs hose into line of central vacuum system running through plant

The vacuum piping is fitted with plug-in terminals at various locations so that flexible hoses and brushes used to remove the dust can be kept at a convenient length. To clean a particular machine or area, the worker plugs his hose into the nearest outlet, vacuums the location, disconnects the hose, then moves to the next area to be cleaned. Hinged caps cover the outlets when terminals are not in use.

So that best possible results are obtained from the cleaning operations, dust is allowed to settle during the weekend, then removed on Monday morning. Manufacturing operations do not begin until this job is completed. Routine minor cleaning is done daily. *From a release of Lamson Corporation, Syracuse, N. Y.*

Concrete Compressor Foundations

RECOMMENDED CONCRETE mix for non-portable compressor foundations is 3,000 lb per sq in. compressive strength at 28 days of age, and a slump not exceeding six inches. The mix should be made with durable aggregates of a size range that will not require more than a total of 40 gal of water, including moisture in the sand and aggregates, per cubic yard. If aggregates containing reactive silica are used, cement must have less than 0.6 per cent sodium and potassium alkalies.

For large foundations, it is important that continual, rather than sectional, pouring take place.

Before the concrete is completely set, the surface should be roughened irregularly with identations, a minimum of ½ in. deep, exposing the aggregate.

Foundation should be allowed to cure for at least one week before

(Continued on page 40)

Pointers in Selection of Filter Fabrics for High Temperature Applications

FILTER FABRICS, used in high temperature applications, should have the most efficient combination of several primary properties to give the best service. These properties include: (1) low resistance to gas flow; (2) good solids retention; (3) the ability to form a porous cake; (4) ease of cleaning; (5) resistance to repeated flexure and mechanical strain; (6) stability to heat and chemical atmospheres, and (7) relatively low bag cost.

Filter cloth specifications for use in high temperature corrosive applications

Cloth	Fiber	Yarn	Weave	Treatment	Maximum Temperature	Resistance To Chemicals
B-23 Orlon	Multi-Filament	High Twist	Twill	Heat Set	275 F	Resists Most Acids
B-26 Orlon	Staple	—	Plain	Heat Set	275 F	Resists Most Acids
B-27 Orlon	Multi-Filament	High Twist	Twill	Heat Set	275 F	Resists Most Acids
I-11 Glass fiber	Warp: Multi-Flmt. Fill: Staple	Warp: Med. Twist Fill: High-Twist	Twill	Coated	450 F	Resists Most Chemicals
I-12 Glass fiber	Multi-Filament	High Twist	Satin	Coated	450 F	Resists Most Chemicals
Vinyon	Multi-Filament	Medium Twist	Twill	Heat Set	200 F	More Acid Resistant Than Orlon
Dynel	Staple	—	Twill	Heat Set	200 F	Resists Most Chemicals

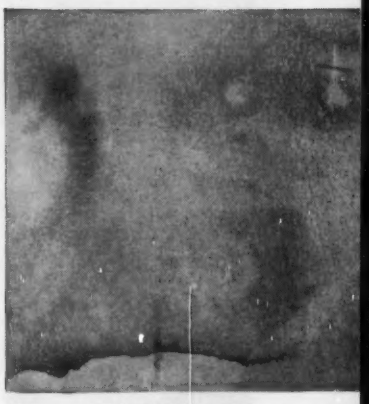
Cloth weave also influences the filtering action, both in the efficiency of collection and permeability. Twill and satin weaves presenting more circuitous air paths than fabrics with a plain weave, offer higher filtering efficiency when the thread count per inch is equivalent.

Finish of the fabric is one of the most important stages in the manufacture of filter cloth, particularly of those materials used in high temperature corrosive applications. Most such fabrics are heat treated to improve dimensioned stability. *From an article by L. B. Nelson, Projection Engineer, in Dust and Fume Topics, published by American Wheelabrator & Equipment Corporation, Mishawaka, Ind.*

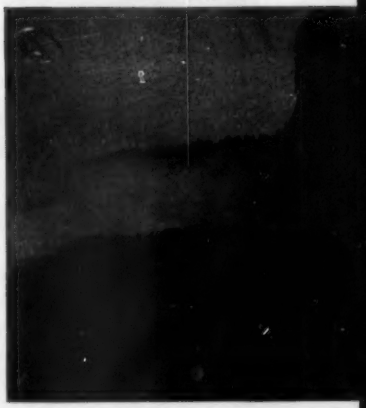
HOW NEW SOLNUS OILS HELP MAKE AIR COMPRESSORS FIRE SAFE

Actual photographs show amounts of carbon residue left after dropping equal quantities of Solnus and two other oils on steel plates and baking in a closed oven at 500°F for 24 hours. The three oils all had viscosities of 300 SUS at 100°F.

SEE HOW CLEAN SOLNUS LEAVES HOT METAL



New SOLNUS Oil 0.9%



Typical Naphthenic Oil 5.5%

Typical Paraffinic Oil 9.0%

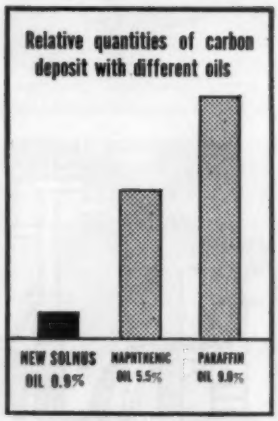
The biggest cause of air compressor fires or explosions is carbon formation on valves and in discharge lines. The best way to avoid these risks is to use the lubricating oil having the lowest tendency to form carbon.

New Solnus Oils have been proved ideal for air compressor use. The minute amounts of carbon that will form are of a fluffy nature; so they blow off quickly and do not build up. Thus the danger of fire or explosion is largely removed.

Solnus Oils have other important advantages, too. Your compressors need cleaning less frequently. This reduces maintenance costs. Shutdowns are less likely. Plant efficiency is increased.

Solnus Oils are also ideal for circulating systems, hydraulic systems, gear boxes, and general lubrication of your industrial equipment. They simplify your storage problems by doing with *one oil* many jobs that would otherwise require *several*. Combine their ability to protect metal parts against corrosion, their resistance to oxidation, and their moderate price and you see how Solnus Oils give you "more lubrication per dollar."

Let us send you our complete technical bulletin on Solnus Oils. Just write Dept. PY-3.



INDUSTRIAL PRODUCTS DEPARTMENT
SUN OIL COMPANY

SUNOCO®

Philadelphia 3, Pa. • **Sun Oil Company Ltd., Toronto & Montreal**

Made by the refiners of famous Blue Sunoco Gasoline and Dynalube Motor Oils

For more facts circle 531 on Reply Card

New Hetron*-Based Self-Extinguishing "FIRE-SNUF" Panels by RESOLITE

A blow-torch applied directly to edge of a Resolite Fire-Snuf translucent structural panel slowly ignites the resin and small flames appear.

The blow-torch is turned aside, and five seconds (note stop watch) after source of heat and flame is removed fire on the Fire-Snuf panel is self-extinguished.

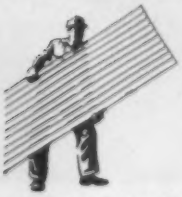
When building codes require a flame spread rating under 75 you can now specify Resolite Fire-Snuf translucent panels for plant daylighting.

These panels are molded of fiberglass and HETRON*, a permanently fire-resistant resin, manufactured by Hooker Electrochemical Co.

Fire-Snuf panels, with flame-resistance chemically locked-in, are just as shatterproof and retain all the other features—high strength, stability and load bearing characteristics—which have made Resolite the most popular new material for plant daylighting.

Fire-Snuf is available molded in all standard Resolite corrugations in lengths up to 13 feet and widths up to 42 inches.

For additional information on Fire-Snuf, see Sweet's Files, consult your distributor or write:



RESOLITE Corporation

Box 517, Zelienople, Pa.

Distributors in principal cities, U.S. and Canada

For more facts circle 532 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 36)

equipment is placed on it. This can be accomplished by using a curing compound, or by keeping the surface wet for seven days if temperatures are normal. At lower temperatures, longer time must be allowed for curing.

To grout the foundation, the top should be roughened and cleaned, then brushed and washed to remove loose particles. Material used to seal the opening at the top of each bolt sleeve, together with the template and forming lumber, must be removed.

The foundation must be made thoroughly wet 20 min before pouring the grout, and kept wet to insure a good bond between grout and foundation. One part of cement, and one part of clean sharp sand is mixed with water to the consistency of thick cream for the grouting mixture.

It is preferable to pour the grout from one side of the frame, then to spread it evenly and work it beneath the frame flange to eliminate a tendency to form air pockets. Do not grout when there is danger of freezing.

Removal of all wedges and shims after grouting has hardened is essential to prevent eventual loosening due to shaking forces.

It is advisable to apply several coats of shellac, followed by paint, at all junctures of the compressor unit and grout, since seepage of oil into these joints is deleterious to both concrete and grout. *From Power and Fluids, published by Worthington Corporation, Harrison, N. J.*

Split Heating System

Two KINDS of fuel supply heat for two types of distribution systems in the offices and warehouse of the Robertson Heating Supply Company, in Alliance, Ohio.

The split system, part steam and

New Style Die Casting For Magnesium

AN AUTOMATIC AND continuous "hot chamber" process for die casting magnesium has been developed by our company. In this system, molten metal is supplied automatically by siphon or gravity flow pipe to a reservoir containing a piston unit. The piston forces the molten metal through a gooseneck into the die cavity at regular intervals. Since the level of the metal in the reservoir is constant, the piston unit receives a continuous supply of metal.

The old method of die casting magnesium in "cold chamber" machines, involves ladling molten metal by hand from a separate pot into a "well" in the casting machine. The operator then activates a mechanical pressure cylinder which forces the metal into the die cavity.

The "hot chamber" process utilizes a metal supply running directly from holding pots in a central melt room, rather than at the machine. Thus, because the supply of molten metal to the machine is automatic, the machine can be run completely automatically and continually. Ingot, charged into the melting pots at one end of the line emerge as finished castings at the other end. The operator has only to lubricate the die, start the cycle by pushing a control button and remove the finished die casting. *From Dow Diamond, published by Dow Chemical Company, Midland, Michigan.*

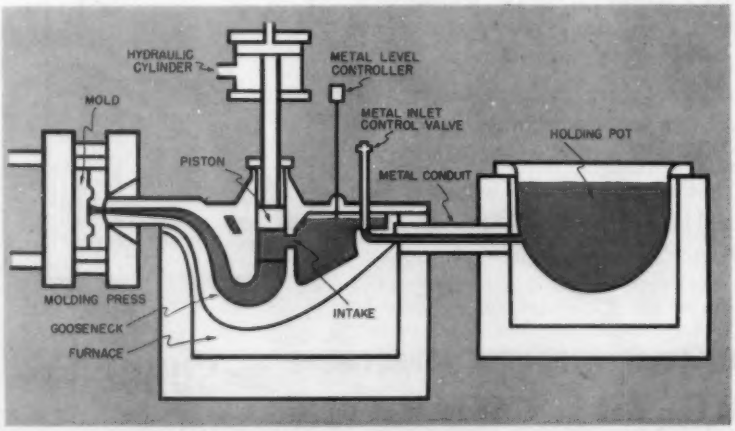
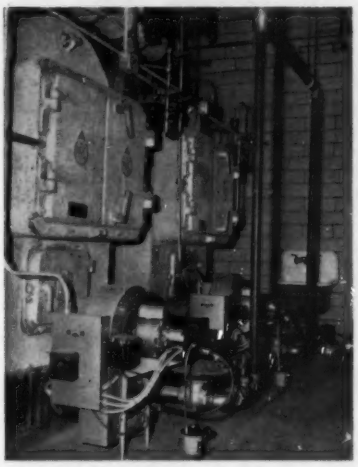


Diagram of a newly developed "hot chamber" magnesium die casting machine

part hot water, was chosen as the most economical and most practical for the 220- by 300-ft structure.

The entire heating load is supplied by two commercial steel boilers, fired by combination gas-oil burners.

Steam from the boilers passes through a two-pipe system direct to 14 steam unit heaters in the warehouse. Mounted near the ceiling at intervals throughout the warehouse, the heaters pro-



Two boilers provide steam to operate unit heaters and hot water convectors

vide a total of 1,084,000 BTU per hour.

General offices, display floor, and other rooms are heated by forced circulation hot water, which is heated by a steam coil then pumped through convectors installed under windows.

A three-zone central system regulates the heaters. *From a release for The National Radiator Co., Johnstown, Pennsylvania.*

Protecting Sprinkler Supplies

ADVANCE PLANNING for emergency connections in automatic sprinkler systems can provide a reasonable degree of protection during a temporary impairment of the regular water supply due to a break in the supply main. With such a break iso'ated by closing the proper divisional valves, water supplies may be available at one point, while an intact sprinkler system may be without water at another.

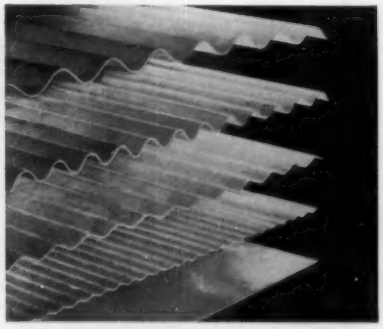
Under these circumstances, a temporary connection between the sprinkler system drain pipe and a "live" water supply, can restore pressure to the system.

Sprinkler drain connections are usually 2-in. pipe, connected near the base of the riser and near the source of the water supply. In a wet pipe system the drain pipe is usually connected above the alarm check valve,

Your plant windows will never have to take this "torture test"

NEW FIRE-RESISTANT PLASTIC makes possible rugged, shatterproof translucent glass fiber panels for plant windows, skylights, partitions, stair wells. Blowtorch flame blackens this window panel, but doesn't make it burn freely. See how burning stops when the flame is removed. Panel contains HETRON®, a new resin that doesn't support fire.

IF YOUR BUILDING CODE calls for a flame spread rating under 75 you can meet the requirement with a HETRON-based panel. You can get panels with ratings of 75, and lower—equivalent to the Building Officials Conference of America classification of "slow burning" or "flame retardant."



YOU CAN SELECT rugged, nonshattering, fire-resistant sheets made with HETRON, in a full range of sizes, gauges, colors; corrugated or flat; translucent or opaque. We'll be glad to tell you which sheet-makers can supply you. Write also for test data and pictures, plus descriptive information on HETRON resins.

HETRON is made by Hooker

From the Salt of the Earth

HOOKER CHEMICALS

HOOKER ELECTROCHEMICAL COMPANY

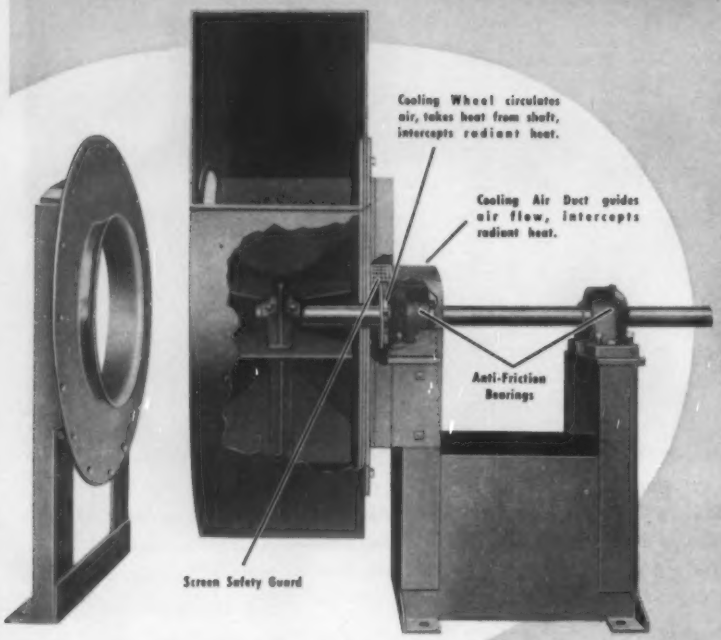
27 UNION ST., NIAGARA FALLS, N. Y.

4-5448

NIAGARA FALLS TACOMA MONTAGUE, MICH. NEW YORK CHICAGO LOS ANGELES

For more facts circle 533 on Reply Card

WANT TROUBLE-FREE high temperature air handling?


Cooling Wheel circulates air, takes heat from shaft, intercepts radiant heat.
Cooling Air Duct guides air flow, intercepts radiant heat.
Anti-Friction Bearings
Screen Safety Guard

New Clarage Type XL Fan shown in "opened up" view is typical of the sizes which provide universal discharge.

MONEY-SAVING SOLUTION:

Clarage's new Type XL Fans equipped with AIR Cooled Bearings!

FOR TEMPERATURES UP TO 750° F., here's a simple, dependable, inexpensive feature available on standard Clarage fans. Costlier water cooled bearings NOT required. By all means, on your next "hot" job consult the Clarage sales engineer about this money-saving optional feature.

The new Clarage Type XL Fan — with its advanced design — offers many other important advantages in industrial air and material handling.

Learn about the high efficiency, rugged construction, and in-the-field adaptability of this exceptional fan equipment by requesting Bulletin 702. CLARAGE FAN COMPANY, Kalamazoo, Michigan.

NOTE: For heavier-duty service or temperatures above 750° F., this and other types of Clarage fans can be provided with water cooled bearings.

You can Rely on...

CLARAGE

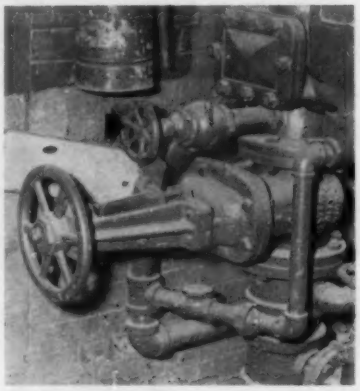
Headquarters for Air Handling and Conditioning Equipment

SALES ENGINEERING OFFICES IN ALL PRINCIPAL CITIES • IN CANADA: Canada Fans, Ltd., 4285 Richelieu St., Montreal

For more facts circle 534 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 36)



Drain connection (arrow) is available when sprinkler control valve must be closed because of break in the main

and above the controlling gate valve in a dry pipe system.

One or more hose thread adapters and necessary lengths of hose kept readily available can be quickly utilized to connect the sprinkler system with a water supply sufficient to operate the sprinklers in the event of fire. *From Sentinel, published by Factory Insurance Assoc., Hartford, Conn.*

No Machine Finishing On Liquid Flame Hardened Gears

HARDENING the teeth and roots of 32-pound bull gears and, at the same time, holding distortion and decarburization to a minimum so that machining would not be required after the heat treatment, was a problem that confronted the Micromatic Hone Corporation, Detroit, Mich.

Liquid flame hardening, a process developed at Yale & Towne Manufacturing Company, was chosen to selectively harden the gear teeth. This technique requires only the addition of a variable speed drive unit, plus a long shaft and supporting fixture, to a conventional electric salt bath.

First, the gears were carburized and drawn, then locked to the shaft in groups of four. The shaft is free to rotate within a fixture suspended over the salt bath by a hoist. The variable speed drive, mounted on a portable stand adjacent to the furnace, is coupled to the shaft, which is lowered until only the gear teeth are immersed in the bath.

The gears are then rotated in the furnace, which contains molten salt at 1450 F. After a 4½ min spin in the

TAPES that take CURVES

An outstanding feature of "SCOTCH" Brand Masking Tapes is the flexible backing that lets you mask curved and irregular surfaces quickly and easily. These versatile masking tapes are also suited for many holding and sealing operations: The aggressive adhesive sticks tightly, strips off cleanly, leaves no residue—saving time and cutting clean-up costs. And, they are fully moisture resistant.

MASKING TAPE...one of 300 PRESSURE-SENSITIVE TAPES for industry, trademarked...

REG. U. S. PAT. OFF.

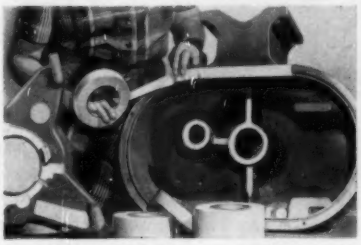
SCOTCH BRAND

The term "SCOTCH" and the plaid design are registered trademarks of Minnesota Mining and Manufacturing Co., St. Paul 6, Minn. Export Sales Office: 99 Park Ave., New York 16, N.Y. In Canada: P. O. Box 757, London, Ontario.

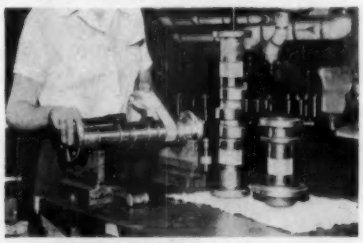
3M

LOOK what you can do with them!

MASK PAINT from areas where it is not wanted with "SCOTCH" Brand Masking Tape No. 202. Sticks-at-a-touch adhesive holds tightly; prevents paint "bleeding"—yet strips off easily without residue.



HIGH HEAT masking operations, such as those in metal working, are easily handled by "SCOTCH" Brand Masking Tape No. 214. Resists temperatures required for bake-oven operations; flexible backing accommodates curves and irregular surfaces.



PROTECT machined or plated areas, stainless steel or enameled surfaces with "SCOTCH" Brand Masking Tape. Heavy paper backing resists abrasion and scratches; tape strips off clean when no longer needed.

FREE FOLDER suggests dozens of ways "SCOTCH" Brand Masking Tapes can save money for you in your plant, whatever your masking or protecting problems. Just write on your letterhead: Dept. PE-35, Minnesota Mining and Mfg. Co., St. Paul 6, Minn.

For more facts circle 535 on Reply Card

...Here's why you get

higher efficiency

from Ingersoll-Rand

MOTORPUMPS

In the final analysis, the efficiency of a pump is determined by the volume and pressure of the liquid delivered compared to the electric power consumed. And here are 4 "reasons why" Ingersoll-Rand Motorpumps give you this greater efficiency:

1. Better design of pump impellers, casing volutes and inlet and discharge passages assure maximum capacity.
2. Better foundry and coring techniques assure clean, smooth pump casings and impellers providing smooth, unimpeded liquid flow.
3. Precision machining assures accurate balance and exact clearance between impeller and casing for best performance under all loading conditions.
4. Thorough inspection assures dimensional accuracy and rigid adherence to design standards.

• For *all* the "reasons why" you get higher efficiency from Ingersoll-Rand Motorpumps in sizes from ¼ to 75 hp, write for our New Motorpump Catalog, Form 7093-E.

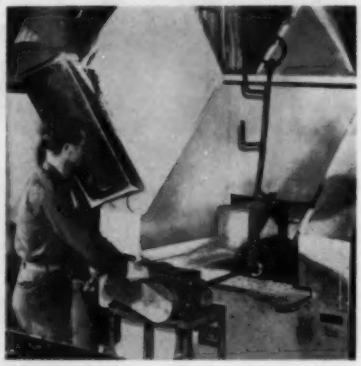
Ingersoll-Rand
11 Broadway, New York 4, N. Y.

9-209

For more facts circle 536 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 36)



Gears are suspended in salt bath for flame hardening and minimum distortion

bath, the gears are quenched in oil at 120 F and drawn at 500 F. After final treatment the pitch diameter and ID were drawn to within 0.001 in. of original size. *From Tips and Trends, published by Ajax Electric Company, Philadelphia, Pa.*

Control Safeguards Lumber

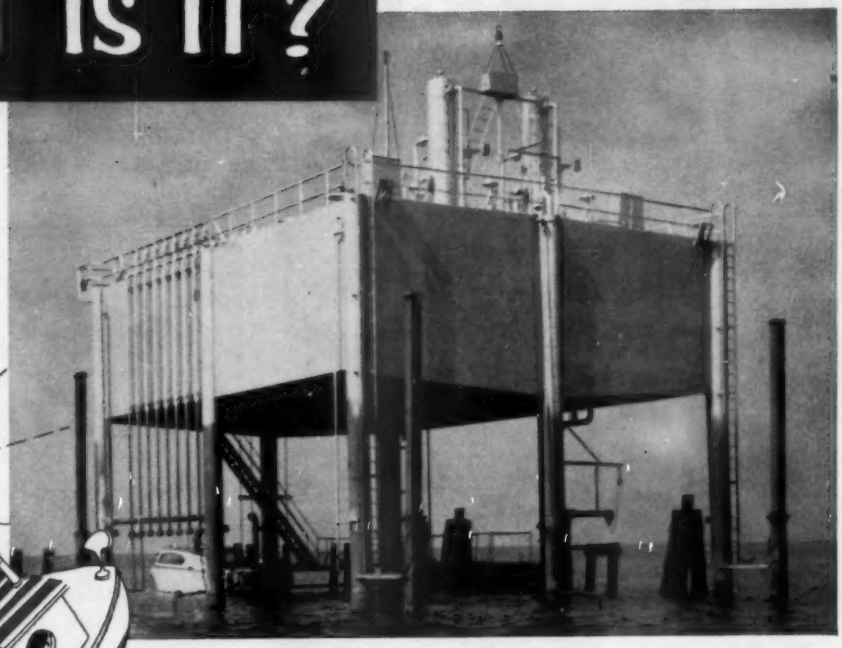
MILLIONS OF BOARD FEET of lumber are safeguarded against possibility of fire from electrical causes by means of a push-button station at the entrance to the warehouse of Independent Lumber Company, Cleveland, Ohio.

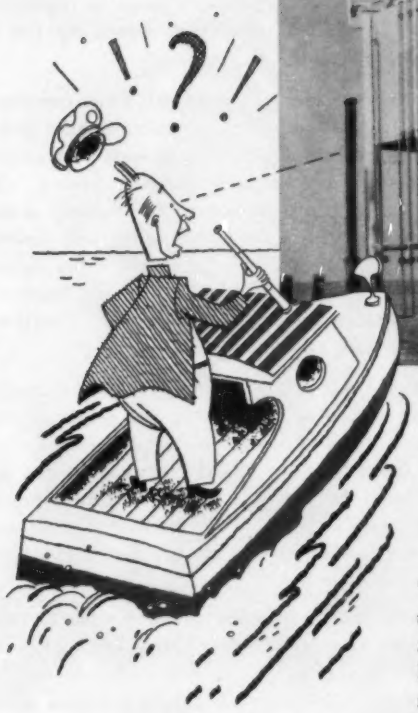
All electrically powered machinery and lights are dependent upon one control station, which in turn can be operated from the push-button station. Thus, one person can turn off all machinery and lights simultaneously, leaving the warehouse electrically dead after working hours.

The installation was made in 1946 and has been in constant use without failure since that time. *From the Clark Contactor, published by Clark Controller Company, Cleveland, Ohio.*

Electrical control panel protects lumber

WHAT IS IT?





An off-shore oil tank coated with INSUL-MASTIC!

Thirteen miles off the shore of Corpus Christi stands this oil storage tank. An island on legs receiving oil from eight off-shore drilling rigs. The water is shallow, the heat and humidity are terrific. Evaporation is rapid and the atmosphere is among the saltiest and most corrosive on earth. That is why the sides and bottom of the island tank are coated with INSUL-MASTIC.

INSUL-MASTIC's heavy, reinforced asphaltic coatings also prevent corrosion in steel mills, paper pulp mills, chemical plants and other industries where the corrosive atmosphere is extremely severe. Claims and appearances can be duplicated, but INSUL-MASTIC's record for maintenance-free protection shows jobs 12, 15 and 20 years old . . . and that record cannot be duplicated.

To prevent corrosion in your plant, specify the protective coating which has stood the test of time. Specify INSUL-MASTIC and free yourself of corrosion and maintenance.

INSUL-MASTIC coatings are made only in the INSUL-MASTIC laboratories from a number of raw materials, each carefully selected for a particular function or quality. Among these are asphalt and Gilsonite.

Insul-Mastic

Think first of the coatings that last!

Representatives in Principal Cities

CORPORATION OF AMERICA • OLIVER BUILDING, PITTSBURGH 22, PA.

For more facts circle 537 on Reply Card

Briefly, this ad illustrates why DEMPSTER-DUMPSTER SYSTEM

Container at right has cast iron bottom and inside walls are lined with fire brick. It handles hot skim off aluminum.

This Tilt Type Container was the result of a cost-cutting idea whereby a high temperature dusty product would be handled by a plant's Dempster-Dumpster. Container has cooling fins, counter-balanced hinged lid with 3-way locking device, 16" sliding gate valve and two sight-glass inspection openings.

Here is a Hopper Type Container with a top door for filling and two bottom discharge doors operated by rack and pinion. Another case where the Dempster-Dumpster System was applied to an additional problem to further reduce costs.

Container at right is just one of several different types we have designed to handle equipment, materials, packages, parcels, etc

IN A NORMAL INSTALLATION the Dempster-Dumpster System is purchased by a plant because of its proved record for handling bulk materials at tremendous savings. This normal installation usually includes one truck mounted Dempster-Dumpster and any number of standard containers designed to meet the various requirements within the plant. In some cases, containers number 40 to 50. These containers can range in capacity up to 21 cu. yds., with all containers served by the one Dempster-Dumpster.

In the great majority of cases this basic installation is just a starter. Management men, constantly looking for lower operating costs, find numerous and amazing extra savings in the Dempster-Dumpster System. Once in service, transporting developments of every description come to light that supplement the original functions of the equipment. Your own men find easier, quicker and additional cost saving ideas for its use. Many even overshadow the original savings and the equipment becomes more and more indispensable.

Look over just a few of the "Special" containers illustrated in this ad. They are all the result of rough ideas that originated with the men in plants after a basic installation, then developed by our engineers. All ideas were stimulated by the powerful Dempster-Dumpster and its flexibility in picking up, hauling, setting down or dumping anything that needs transporting, at lower cost.

One man, the driver, and a few simple hydraulic controls in the cab of a Dempster-Dumpster, will become indispensable in your plant. It is just that in hundreds of plants of every description throughout the nation. Let one of our representatives give you details of installations. Manufactured exclusively by Dempster Brothers, Inc.

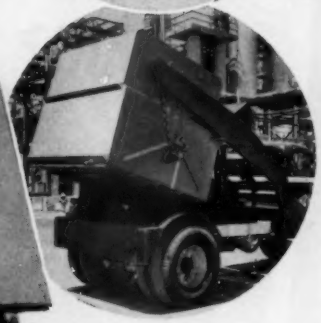
Above container is built with cast iron liner. The holes in outer wall are for cooling.

Here is one of several special drop bottom type containers equipped with coupiers and ball bearing trucks for operation in train on rails.

THE DEMPSTER DUMPSTER SYSTEM

DEMPSTER BROTHERS

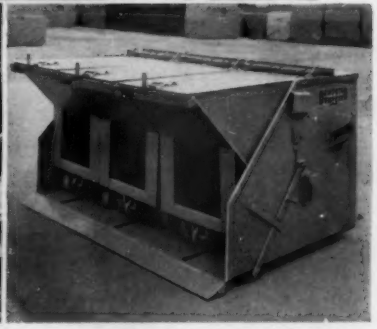
so many plants find the indispensable...



Two photos above show how all containers, regardless of design, are picked up and hauled. At destination materials are dumped from drop bottom containers as shown at left . . . from Tilt and Skip Type Containers by tilting. Any load, of course, may be set down intact.

This is a special adaptation whereby waste zinc slurry is pumped into two containers, which serve as settling tanks, enabling majority of the water to be decanted before sludge is transported and dumped at waste basin.

Tank Type Containers are available with or without casters in steel, aluminum, stainless steel, etc. Capacity ranges up to 1,200 gal. They may be lined with rubber, lead, highly resistance coatings, etc.



This is a master container with three 2 cu. yd. insert containers. Each insert container is provided with casters, counter-balanced spring-hinged lid for loading and dumping.

135 Shea Bldg., Knoxville 17, Tennessee

What's YOUR heating job?

STEAM?

Modine builds 28 sizes of vertical delivery units—14 for standard and 14 for low outlet temperatures—with choice of four easily attached deflectors. There are also 19 horizontal and ten power throw models for standard and low outlet temperatures.

HOT WATER?

Vertical delivery units come in 14 sizes with a choice of 4 easily attached deflectors. Five horizontal models are designed specifically for hot water. Five power throw models are also available.

GAS?

Only Modine gas-fired unit heaters have stainless steel burners and a choice of stainless or aluminized steel heat exchangers. Seven sizes—25,000 to 220,000 Btu. A.G.A. and C.G.A. approved for natural, mixed, manufactured, LP and LP-air gases.

You name it— Modine has the unit heater to do it better . . . at lower cost

WHATEVER your unit heating needs, you can depend on Modine for maximum heating comfort at lowest possible fuel cost. For over 25 years, the Modine name has been synonymous with quality and advanced engineering.

Take steam and hot water unit heaters, for example. Discharge air temperatures of 110-120° F are correctly related to air velocity for heating at its best. There's minimum heat loss compared to some units that discharge air at such high temperatures that it immediately rises to the ceiling, or others with velocities so low that the heat reaches only a small area.

As for gas-fired unit heaters, Modines are only half the weight, half the size of other leading makes. You save installation costs, save on shipping charges. And this same advanced design means longer life, five-second heating response to thermostat's demand.

Yes, from every angle . . . for every job—you're way ahead when you specify Modine unit heaters. You'll find it pays to buy the greatest name in unit heating.

For facts on steam and hot water unit heaters, see the Modine representative listed in your classified phone book. Or write today for your copy of Catalog 154.

Get complete information on gas-fired unit heaters. Write for Bulletin 654 to Modine Manufacturing Company, 1563 DeKoven Avenue, Racine, Wisconsin.

U-1231

Modine UNIT HEATERS

For more facts circle 539 on Reply Card

Bright ideas..

The automotive industry is noted for its Bright Ideas . . . it uses felt in at least 82 different ways, because the right type of felt does those jobs best.

It's a Bright Idea to keep felt always in mind, for factory processes and equipment, and for finished products of all kinds. No matter what you make, or are designing, remember that felt can polish, seal, lubricate, control vibration and noise, act as a filter, do many other tasks with efficiency, economy and long life. American supplies felt of all types, in rolls, sheets, and parts cut to your dimensions, ready for assembly. If you will tell us what you make, we will consult with you and provide technical information.

American Felt Company
TRADE MARK ®

FREE! Write on your letterhead for special folder, "S.A.E. Felts." Contains samples and standards.

GENERAL OFFICES: 80 GLENVILLE ROAD, GLENVILLE, CONN.
SALES OFFICES: New York, Boston, Chicago, Detroit, Cleveland, Rochester, Philadelphia, St. Louis, Atlanta, Dallas, San Francisco, Los Angeles, Portland, Seattle, Montreal — PLANTS: Glenville, Conn.; Franklin, Mass.; Newburgh, N. Y.; Detroit, Mich.; Westerly, R. I.
ENGINEERING AND RESEARCH LABORATORIES: Glenville, Conn.

For more facts circle 540 for Reply Card

OPERATION AND PRODUCTION pointers for the industrial plant engineer

Edited by H. E. B. Anderson

Heat Transfer Unit Maintenance

REMOVAL OF SCALE from pipe coils used in industrial process heating frequently occasions downtime and expensive maintenance. The operation is necessary since experience has shown that scale is one of the biggest factors in reducing the efficiency of heat transfer equipment.

An automotive manufacturer required that a bonderizing tank be brought to a temperature of 180 F. Only enough pipe coil could be placed in the tank to bring the temperature to 140 F. In addition, the coils had to be taken from the tank each week to have the deposits removed.

The manufacturer solved both of these problems with the installation of a plate type coil. This unit consisted of two sheets of metal welded together to form channels for the passage of heating or cooling media. The Plate-coil raised the temperature of the bonderizing tank to the necessary 180 F, and during the first six months of use, did not require removal from the tank for cleaning purposes.

Similar, stainless steel units, which are made by Tranter Manufacturing, Inc., of Lansing, Mich., are cleaned by "shocking." This consists of running live steam through the coil, followed by cold water. Rapid contraction of the metal loosens the surface deposits and obviates the need for removing the unit from the tank. Other means of cleaning are with steam or brush. In this case, the light weight of the unit makes it easily removable from the tank for cleaning.

Scale is removed from this plate type coil with steam followed by cold water

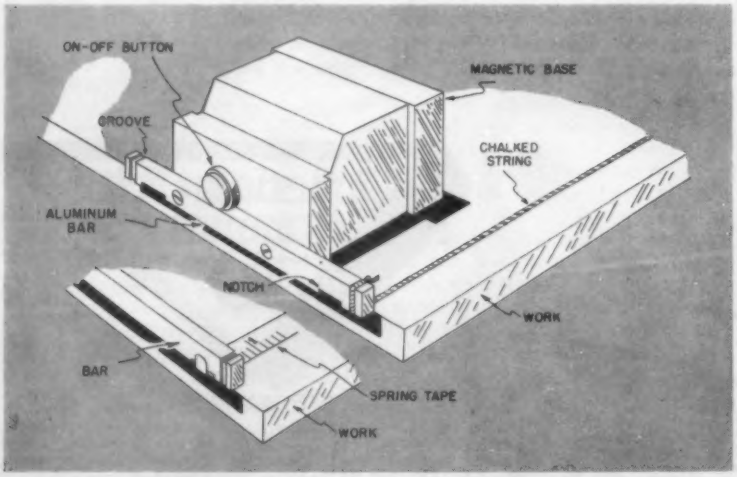
In solutions where sediment or other foreign material may be introduced, the heat transfer unit may be installed vertically, thus minimizing the surfaces on which sediment can settle.

One-Man Magnetic Line Marker for Steel Plate

USUAL METHOD of marking a steel plate with a chalk string or a spring steel tape, in preparation for flame cutting, requires the services of two men.

With the assistance of a magnetic holder the measuring operation can be performed by one man. The holder consists of a standard magnetic base with a push-button arrangement which will release the magnet when desired. The holder is modified by the addition of a rectangular aluminum section bar, fastened to one face of the magnet by means of two countersunk head screws. Notches are cut in the lower surfaces of the bars toward the ends which project on each side of the magnet. A small groove is machined around each end of the bar, and a chalk string fitted into either one. The magnet is then positioned on the plate and the chalk string used in the usual manner, by one worker.

The same device can be used with a steel tape by fitting one end of the tape into one of the notches in the bar. The clip on the end of the tape will bear against the face of the bar. The bar can be placed flush with the edge of the metal plate or it can project over the edge of the workpiece.



Drawing shows the construction of a one-man-operation magnetic line marker

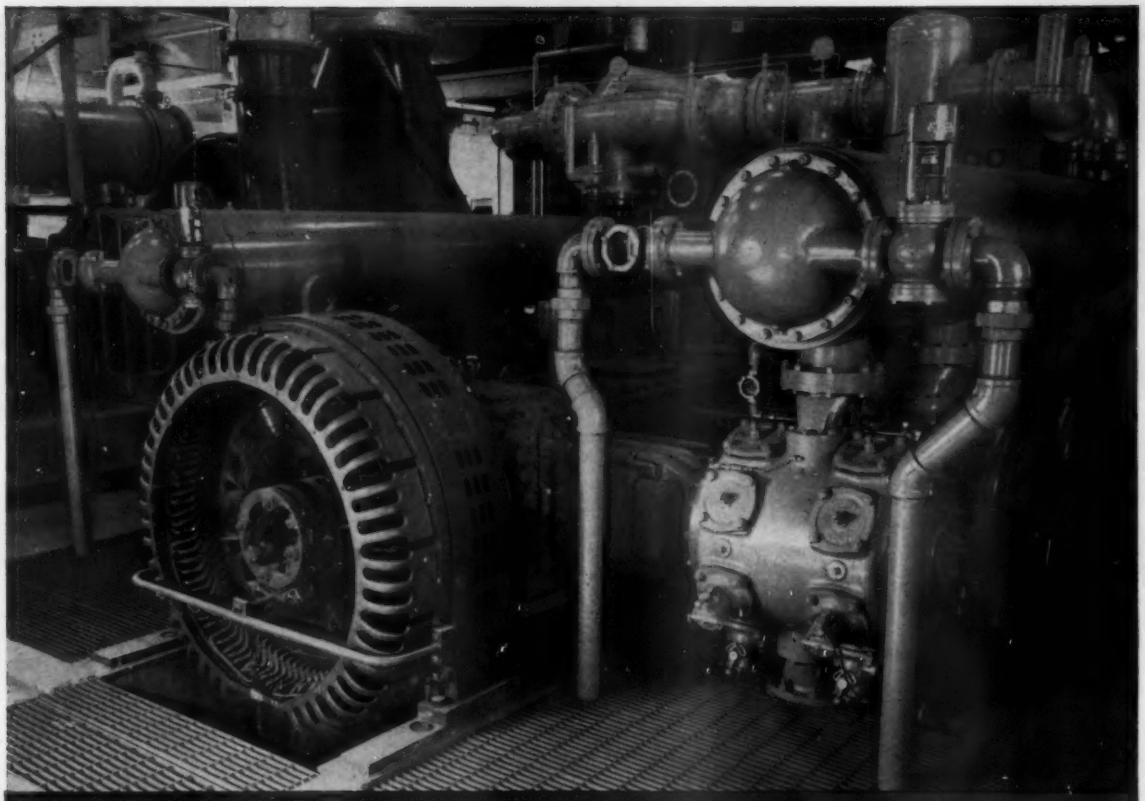
Basic Electrostatic Painting

IN THE LAST FEW years a new painting system has been developed that is fully automatic, yet is 50 per cent more economical in paint consumption than any other spraying system. This new method, electrostatic painting, has proven itself tremendously flexible, and is being used for the finishing of everything from refrigerators to staplers.

Electrostatic painting is based on the theory that opposite electrical forces will attract. Paint is given a negative electric charge, the product and its conveyor are at ground potential, and act as a positive force in relation to the negatively-charged paint. This opposite electrical polarity causes the paint to deposit on the product, eliminating much of the overspray found in other systems. Since the system is automatic, it also means that by eliminating the human element, and relying solely on the electrical attraction, a uniform finish can be achieved on the parts being sprayed.

A high voltage transformer-rectifier unit is used for setting up the necessary electrical field. The input to the units is 110/220 volts, single phase, 60 cycle ac, and 500 watt maximum; its output is 100,000 volts with a 5 milliamp dc maximum amperage.

The 100,000 volts are impressed on a "U" shaped electrode. Needle-like projections on the electrode, pointed in the direction of the conveyor line, aid



CLARK BALANCED/OPPOSED COMPRESSOR

Used for testing jet components in Bendix Aviation's new research center

Speeds up to supersonic levels! Atmospheric conditions ranging from sea level to 80,000 feet! Temperatures from minus 100° F. to plus 800° F. These are the conditions at which Bendix Aviation Corporation's new research facility at Teterboro, N. J. can test component equipment for jet aircraft and missiles.

Destined to save thousands of man-hours of engineering research, the new facility utilizes the latest combinations of pneumatic and electrical equipment. Playing an important part is a Clark 600 horsepower CMA-6, Motor Driven, Balanced/Opposed Compressor which supplies air at 200 psi for test purposes.

Because of the nature of the operation, perfect balance and accurate match of supply to demand, through flexible compressor cylinder loading, were important considerations in the selection of a Clark unit. Compactness saved considerable floor area.

A complete Clark line of Balanced/Opposed Compressors in the 150 to 4500 horsepower range is available in various cylinder arrangements to meet practically any requirement. A Clark representative will gladly furnish complete details. Write for Bulletin 118.

CLARK BROS. CO. · OLEAN, N. Y.

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compressors

For more facts circle 541 on Reply Card

OPERATION—PRODUCTION

(O and P begins on page 50)

in directing the flow of electrons and establish a strong electrical field between the points and the product on the conveyor.

The automatic spray guns are at a right angle to the conveyor line and approximately two feet away from it. The electrode is hung halfway between the guns and the conveyor.

Paint is sprayed at 8 to 15 psi into the electrical field set up by the electrode. In the electrical field, two forces join with the initial velocity given to the paint to move the particles in the desired direction. First, the paint is given a negative charge which pulls it to the closest grounded object — the product on the conveyor. Second, this flow of electrons from the electrode to the unpainted part is similar to a wind current, which literally moves the paint particles with it in the desired direction.

The guns are triggered on and off automatically, normally by a limit switch. The conveyor parts hangers trip the limit switch, which activates a timer controlling the length of spraying time. Where flexibility requirements prevent use of a limit switch, an electric eye can be successfully employed.

Due to the electrical attraction employed by this system, a unique phenomenon, the "wrap around" effect, takes place. In order to spray the edges of a part, considerable paint is wasted in overspray. However, with electrostatic painting this overspray will pass the part, turn 180 degrees and be deposited on the back of the part or on the sides. This not only increases painting efficiency greatly, but also eliminates frequent booth cleaning to remove overspray.

Coupling the electrical attraction with the slow velocity of the paint particles, rebound is cut to a minimum. The rebound found in other systems where the atomizing air pressures are 40 psi or more is a larger contributor to waste paint.

Paint manufacturers can provide a figure of the maximum square feet a certain paint will cover at a given thickness. This figure is arrived at by computing the solids content in the paint. Hand spraying systems seldom achieve more than 40 per cent of this figure; a properly engineered electrostatic system can be operated above 90 per cent of maximum coverage.

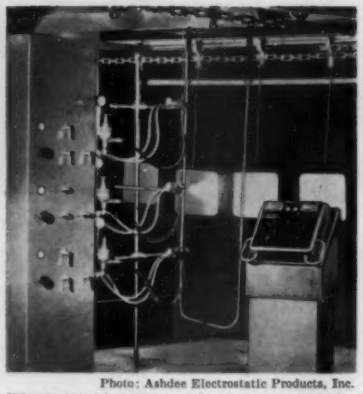


Photo: Ashdee Electrostatic Products, Inc.

Electrostatic spraying components. Left, spray gun stand; right, transformer-rectifier unit. U-shaped electrode in center directs electron flow

Synthetic Fiber Valve Covers

ACID AND CAUSTIC resistant valve and flange covers, made of synthetic fiber fabric, are protecting workers from possible injury caused by acid

(Continued on page 54)

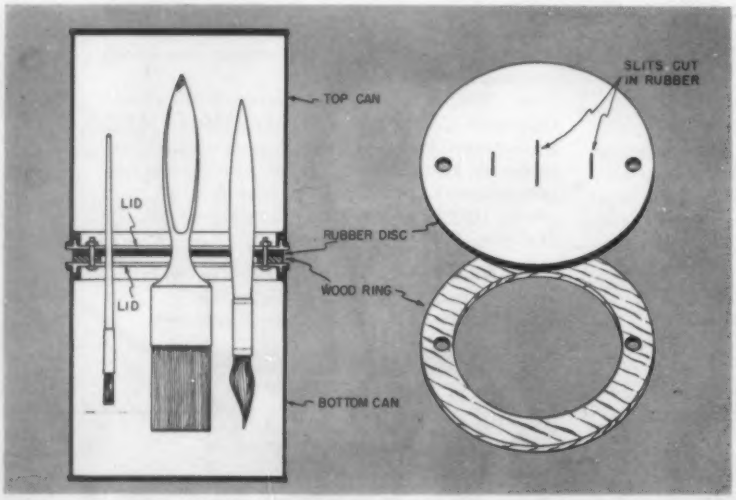
Air Tight Can for Storing Paint Brushes Keeps Bristles Soft Between Jobs

Contributed by R. E. Franklin

MAINTENANCE OF BRUSHES used in odd-job painting frequently requires more time than the painting itself. To avoid excessive expenditure of time in cleaning brushes in one maintenance shop, a container was designed in which the brushes could be stored without first being cleaned, and so that they would be ready for use at any time.

This required that the container be air tight, in order that the paint left on the brushes would not harden between jobs.

A suitable container which accomplished this purpose was made with two 4-lb paint cans, fastened lid-to-lid. The brushes were suspended in the cans so that the bristles projected into the lower can and the handles into the upper can. In this way the bristles would not be bent or spoiled.



Cross section, left, shows can construction; detail of the disc and ring, right

To construct the can, the center portion of each can lid was removed, leaving a narrow rim. A rubber disc, held in position by a wooden ring, was fitted into one of these openings. The lids were then joined by passing small bolts through the rims of both lids, the wooden ring and rubber disc.

To store the brushes, they are inserted in slits cut into the rubber disc. The lower lid is replaced on one of the cans, then the second can is inverted and closed firmly over the upper lid. The exterior of the cans may be painted to prevent rust and subsequent leakage of air into the cans, causing hardening of the paint.

The two lids, may, as an alternative, be soldered together to insure a perfect seal, instead of being fastened by bolts. When a brush must be removed, the upper can may be lifted and the brushes pulled through the rubber disc. Spring clips, soldered to the inner edge of the lid rim, may be used instead of the rubber disc to hold the brushes.

For more facts circle 542 on Reply Card

NEW SIZE 1 REVERSING DRUM SWITCH

with advanced design and appearance matching the popular Size 0

Comparison Proves It... This Drum Switch Leads the Field!

• Convertible (without tools) from maintained position to spring return • Compact size • Modern streamlined styling • Long electrical and mechanical life • Pressure wire connector terminals • Generous wiring space • Single captive cover screw • Two ½" conduit openings

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Square D Company, 4041 North Richards St., Milwaukee 12, Wis.

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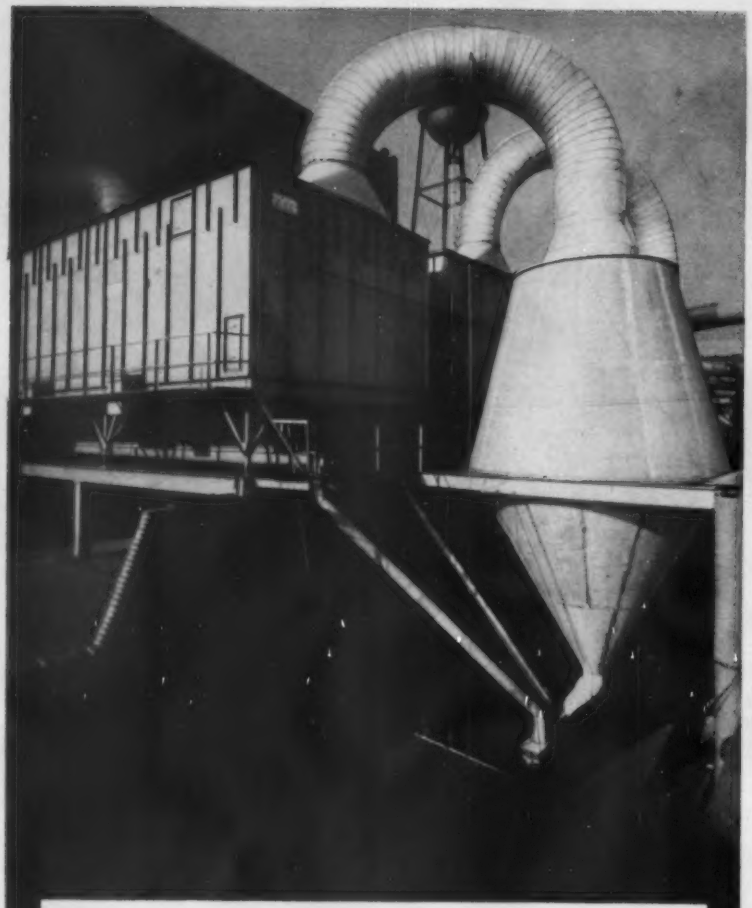


Dust got their goat at Amalgamated!

Pangborn rids plant of goatskin dust, gets higher production at lower cost.

Processing 25,000 goatskins daily created a serious dust problem for Amalgamated Leather Co., Wilmington, Del. Dust was so thick during the buffing operation that workers had to stop every half hour to clean up. Pangborn Dust Control solved this problem. The atmosphere during buffing is now clean. Workers do better, *continuous* work. Plant and machinery maintenance costs are lower. No wonder Amalgamated says Pangborn is "really doing a job"!

Pangborn can solve *your* dust problem. Pangborn engineers will be glad to show you how Pangborn Dry or Wet Dust Collectors can save you time, trouble and money!

See how Pangborn benefits varied industries. Write for free copy of "Out of the Realm of Dust." Pangborn Corp., 5200 Pangborn Blvd., Hagerstown, Maryland.

Pangborn CONTROLS DUST

For more facts circle 543 on Reply Card

OPERATION — PRODUCTION

(O and P begins on page 50)

and chemical leakage at the Perth Amboy, N. J. plant of California Oil Refining Company.

The covers, which have replaced the conventional lead type in many parts of the refinery, are made of a synthetic fiber fabric developed by

Synthetic fiber valves and flange covers resist acid, are launderable, reusable

Union Carbide and Carbon Corporation. For this application they must be strong enough to contain sprays of chemical resulting from failure of a gasket or packing on a pressurized line and, at the same time, permit complete operating freedom of the covered valves.

The new style covers conform to the contour of the valve connections and are easy to install. Repair work is simplified since they need only to be unwrapped, instead of cut or burned off, as with lead covers. The covers can be laundered and reused, or are easily stored.

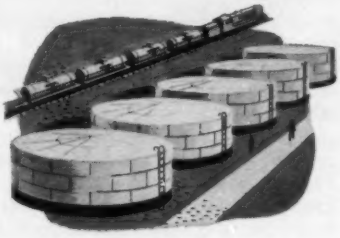
Since spring of 1954, when the covers were first used, they have proved superior to the metal type both in initial cost and upkeep.

Automatic "Taring" Speeds Bulk Weighing

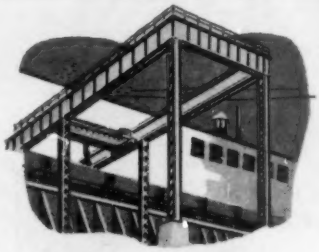
AN UNUSUAL METHOD for weighing out a bulk material and delivering it to process equipment has been designed for the Firestone Tire & Rubber Co. at its Hamilton, Ontario, plant.

In this operation, bulk material in the form of rubber pellets is fed directly from screw feeders to a hopper car that is suspended on a return monorail. A prescribed quantity of

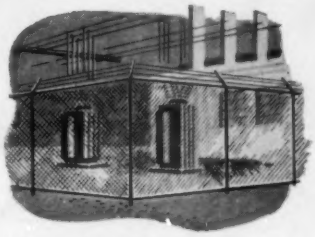
Here are 6 Trouble Spots where PITT CHEM® can Stop Corrosion!



TANKS

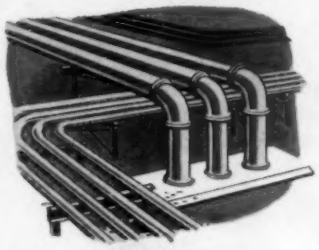


STRUCTURAL STEEL

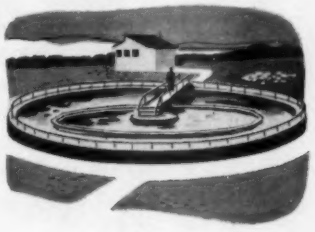


STEEL FENCES

PROCESSING EQUIPMENT



PIPING



WASTE DISPOSAL

WHAT are *you* doing to stop costly corrosion in trouble spots like these? Using ordinary paints? They probably won't do, because most industrial corrosion has an insatiable appetite for thin, conventional paints. It takes a thick, tough, heavy duty protective coating to *really* halt corrosion's march on your plant and equipment investment.

Pitt Chem Tar Base Coatings fill the bill in every particular. They're so resistant to moisture, alkalis, mineral acids and weather that they'll outlast a dozen applications of ordinary paint. Yet they cost no more per gallon and they're easy to apply.

Look at it this way: *No other material does such a complete job of protection at so little cost.* And we've got the facts to prove it. If you want to stop corrosion in your plant, we'll be glad to show you the most economical and effective way to do it. Write for complete details today.

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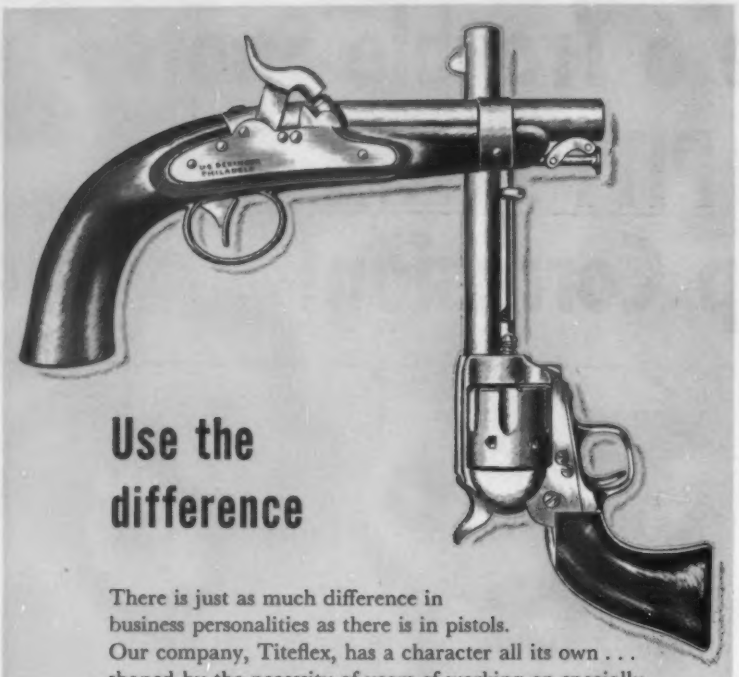

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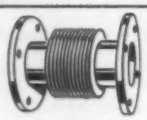
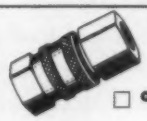


☐ Precision Bellows



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Left—Deringer Percussion Pistol, 1843 Right—Colt Army Revolver Famous "44", 1872

For more facts circle 545 on Reply Card

OPERATION — PRODUCTION

(O and P begins on page 50)

material is automatically deposited in the car, and its weight automatically checked for correctness.

The hopper car is then propelled along the monorail to a point of delivery into a Banbury mixer. After discharging its load, it is returned to the loading station.

Each weighing may be observed on a large scale dial, and individual net weighings are recorded. The entire weighing operation is set up and controlled from a remote panel board. If weighings are over or under the prescribed amount, an alarm is sounded at this board.

A section of the monorail is hooked up to a scale-beam system and acts as a scale, with the hopper car functioning as a weigh hopper. The scale-beam mechanism is identical to standard beam arrangement used on automatic scales, and has the accuracy of the standard mechanism.

Feature of the system is the automatic and instantaneous tare-weighing of a hopper car before loading begins. Advantage of the taring process: The weight of the hopper cars runs between 450 and 500 lb. If weights were not tared, cars would have to be exactly the same weight in order to have each deliver identical weights.

Heart of the weighing system developerd by Richardson Scale Co., Clifton, N. J., is a high-precision servomechanism system. Transducers are located at the dial scale, weight-selector dial, remote indicator, and the recorder.

At the Hamilton plant, two monorail weighing systems are in operation, feeding two Banbury mixers. Hopper cars have capacities of 500 lb. Two grades of pelletized rubber, fed by two screw conveyors, may be loaded into the car from each loading station. Weights are changed as many as three times a day in each system, depending upon the type of rubber being compounded. One man runs the entire weighing and handling operation.

Tunnel Cuts "Highway" Travel

Contributed by A. T. Lohkamp
Plant Engineer, Pasco Packing Co.

A TUNNEL PROVED to be the most economical and practical solution to the problem of moving frozen fruit concentrate from the packaging department to sub-zero storage rooms at the Pasco Packing Company, Dade City, Fla.

Distance from the packing room to

Photo: Armco Drainage & Metal Products, Inc.
Fruit concentrate is handled rapidly and easily by transporting it through a tunnel instead of along ground level

the storage area was actually 300 ft. The only available route required traveling nearly 2000 ft. Industrial trucks and trailers carrying the concentrate were obliged to leave the plant, join a stream of plant traffic, travel 150 ft on the highway, re-enter the plant and cross a double railroad track and five sidings before they reached the storage warehouse.

Installation of a conveyor was considered but the versatility, fewer maintenance problems and lower capital investment led the company to decide on the use of a tunnel. In addition, barrels, five-gallon pails, or cases of goods could be handled with equal ease in a tunnel.

Construction of a 12-ft diam tunnel of Armco liner plates made possible the transportation of the fruit concentrate with a minimum of equipment and travel. Two fork lift trucks are now able to handle the work which formerly required three trucks and nine trailers to move it, and two lift trucks for loading and unloading.

The smooth, level floor in the tunnel prevents loss due to cartons being bumped off the pallets and damaged.

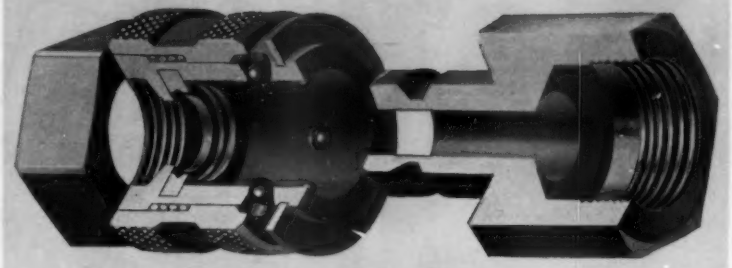
Faster Bricklaying

Contributed by F. E. Riley

A NEW METHOD of laying bricks, adopted at the plants of Imperial Chemical Industries, England, has made a 22 per cent saving in man hours.

Under the old systems of bricklaying, the ends of a wall were built up to a height of 4 ft then tapered downward toward the center of the wall. The tapered portion required that each course be checked with a plumb line. For the average wall this meant plumbing 216 bricks, taking 159 min for the job. The wedge shaped gap in

...to make a leakproof connection



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New, economical Titeflex QUICK-SEAL Couplings are leakproof at *all* operating pressures—provide full swivel action, full free flow, versatility, long service life—couple & uncouple IN ONE SECOND without tools. QUICK-SEAL Couplings are interchangeable in the same size; come in a variety of alloys in many sizes—¼" to 12" diameter. Straight-through, Single and Double Check-valve types. ***Write today for Titeflex* QUICK-SEAL *coupling catalog.***

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The higher the pressure the tighter the seal

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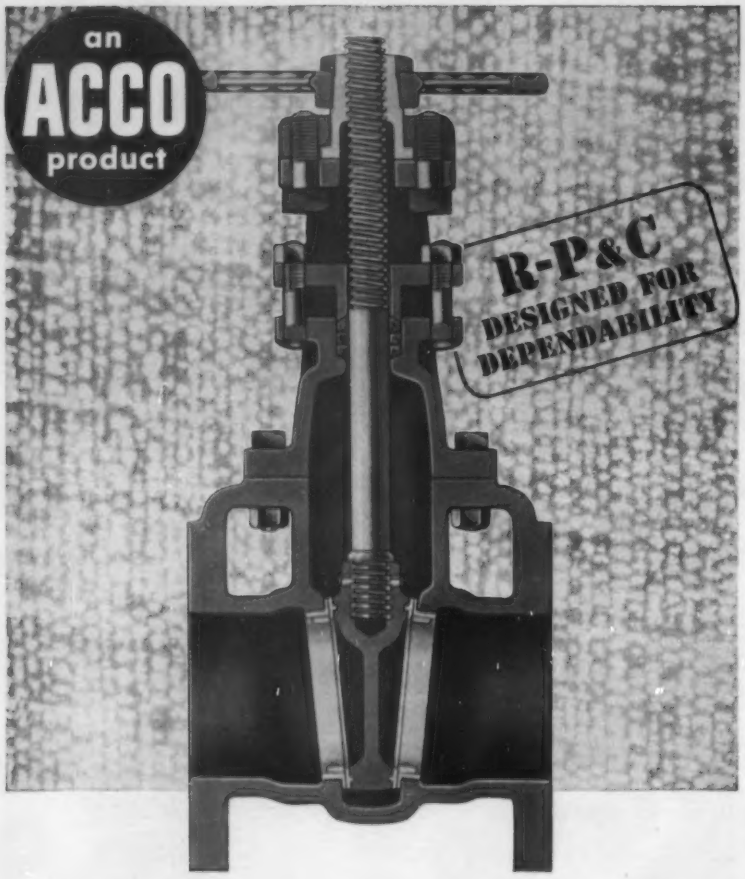

Wedge Gates from 2" to 24"

—FROM R-P&C's COMPLETE LINE OF IRON BODY VALVES

• Thousands of these Fig. 625 iron body wedge gate valves, in hundreds of different services, are giving the dependable economical service which has come to be synonymous with R-P&C. Rated for 125 lbs. Steam—200 lbs. OWG in sizes up to 12", and for slightly lower pressures in larger sizes, they are regularly furnished with bronze trim for use with steam, water, oil or gas. Also provided in all-iron for use with fluids which attack bronze.

• Their record for dependable service and low maintenance requirements is shared by R-P&C's complete line of iron body valves—gates, globes, angles, checks and cocks in a complete range of sizes, body styles and pressure classes up to 250 lbs. All are made from castings of special fine-grained, high test, cast iron —50% stronger than ordinary cast iron. Precision manufacturing and step-by-step quality control result in tight closures, easy operation and longer wear.

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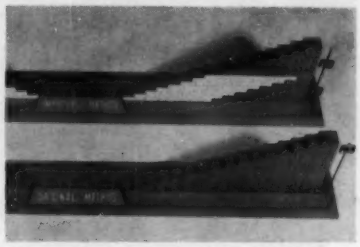
For more facts circle 547 on Reply Card

OPERATION—PRODUCTION

(O and P begins on page 50)

the wall was then filled by laying the bricks to a line.

It was found that the latter operation was accomplished at a faster rate than the laying of the first bricks. If



White bricks in model show part of wall not plumbed in new method

the number of bricks to be plumbed could be reduced, less time would be required to complete the job.

A timesaving was made by building each end of a wall to a height of 2 ft instead of 4 ft, so that only 126 bricks had to be plumbed and an additional 96 could be laid to line. Time for this operation was 124 min.

Switch Mats In Industry

Contributed by Tom M. Gayle

A "STEP-ON" switch mat, originally designed for use in stores and homes, is adaptable to industrial applications. The unit operates by closing internal contacts when a part of it is subject to normal body weight. While the mats are waterproof and resistant to most common solvents, they are normally energized by low voltage alternating current to insure safety in case of damage to the mat.

Connected to a buzzer or bell, a switch mat can be used to advantage when placed at the tool crib issuing window or other counter where infrequent attendance is required. With suitable load relays mats will operate automatic door openers, dispensing devices or counting registers.

They also have safety applications. With correct machinery interlocks a mat will insure that a certain spot is occupied or unoccupied, as might be required, before a machine or operation is started. Use of a mat, rather than a hand switch, for the emergency shutdown of machinery in case of accident is another safety application.

Alarms, safety showers, emergency ventilating equipment, etc., might also be operated by strategically placed switch mats.

WHITING

OVERHEAD CRANES

"HOW TO SELECT AN OVERHEAD CRANE"

The information *you* need for planning and selecting the overhead crane that will give the best performance at the lowest cost is contained in a new Whiting booklet . . . Bulletin Unit 79. A helpful, technical bulletin, "How To Select An Overhead Crane" is packed with important data that is of interest to all concerned with heavy materials handling.

A partial list of contents reads as follows:

- The classes of crane service
- Standard crane ratings and capacities
- Standard dimensions and clearances
- Recommended speeds
- Motor ratings
- Cage or pendant operation
- How to choose the gear drive
- Structural framework recommendations
- Lubrication of gears and bearings
- 14 minimum safety features
- Erection and initial operation
- Sample form—How to request crane information
- Sample specifications

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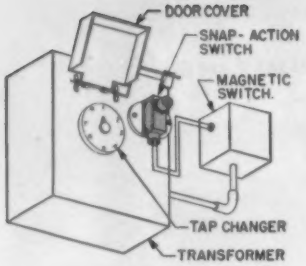
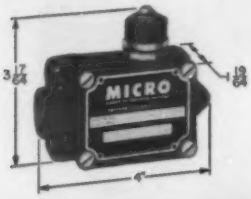
MICRO SWITCH Precision Switches
A PRINCIPLE OF GOOD DESIGN

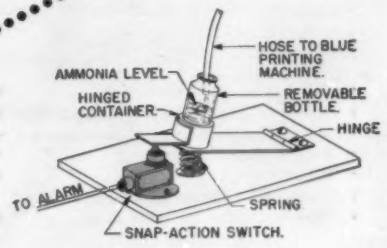


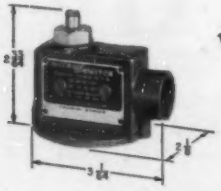
High voltage cut off when door is opened

Raising the cover of this high voltage transformer actuates the MICRO SWITCH unit. This causes the primary switch to disconnect the transformer from the line. It is impossible to change taps until power is cut off.



INCREASE PRODUCTION
...efficiency
...safety
by installing MICRO SWITCH units!



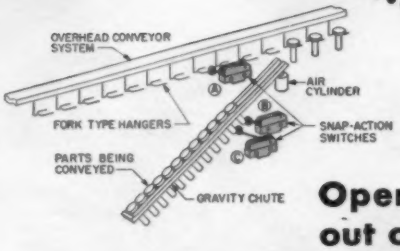


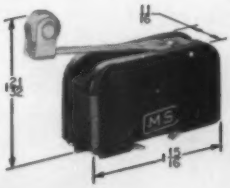
Ammonia won't spill in blue print machine

When ammonia bottle is about ¾ full, weight actuates switch. A warning bell sounds to notify operator to empty or replace bottle.

• Plant superintendents, engineers, electricians, maintenance men—in every type of industry—are finding MICRO SWITCH precision switches the most economical and efficient method of increasing productivity of their plant equipment. Switches are used to make machinery more automatic, safer and more efficient. Here's how some of them do it:

See your MICRO SWITCH distributor. Look in the Yellow Pages of your phone book. Ask for Catalog 101 on Switches for Industrial Use.





Operator is never out of parts

Switch A operates air cylinder which picks part off hook and drops it into gravity chute. Switches B and C cut out Switch A when parts 11 and 12 are in place. As soon as part is removed, pick-off starts again.

Write for MICRO TIPS
This publication will show you how to make your plant safer, more automatic—more productive—with precision switches.

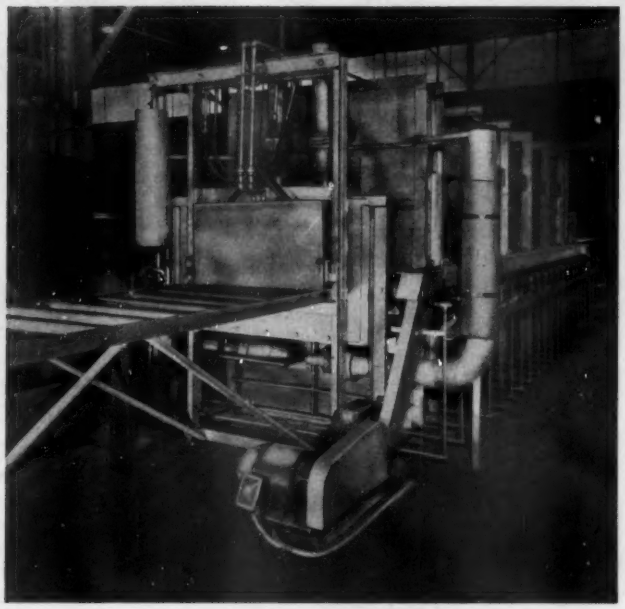
MICRO SWITCH
A DIVISION OF MINNEAPOLIS-HONEYWELL REGULATOR COMPANY
In Canada, Leaside, Toronto 17, Ontario • FREEPORT, ILLINOIS

H HONEYWELL

For more facts circle 549 on Reply Card

For more facts circle 550 on Reply Card →

use 'dag' dry films for trouble-free lubrication



Here's how a Cleveland foundry proved the value of 'dag' *dry-film lubrication* in the operation of its continuous core-oven conveyor . . .

A 'dag' Colloidal Graphite dispersion was used in place of powdered graphite. The lubrication interval of conveyor chain and rollers was extended from *four* days to *sixty* days! In addition to tremendous lubricant and labor savings, conveyor wear has been notably reduced, carbon formation and flake-off eliminated.

This is typical of the extreme-temperature problems solved by 'dag' dispersions . . . problems with kiln cars and hot-strip mills . . . problems with *any* moving parts subjected to temperature extremes . . . problems where solvent action in degreasers or other situations destroys conventional lubricants.

You'll find a surprising number of ways to use 'dag' dispersions described in our free booklets. Write today for Bulletins No. 424-X6 and No. 435-X6.

Dispersions of molybdenum disulfide are available in various carriers. We are also equipped to do custom dispersing of solids in a wide variety of carriers.

Use 'dag' colloidal graphite to stretch maintenance dollars over 1400 percent!

ACHESON COLLOIDS COMPANY

PORT HURON, MICHIGAN

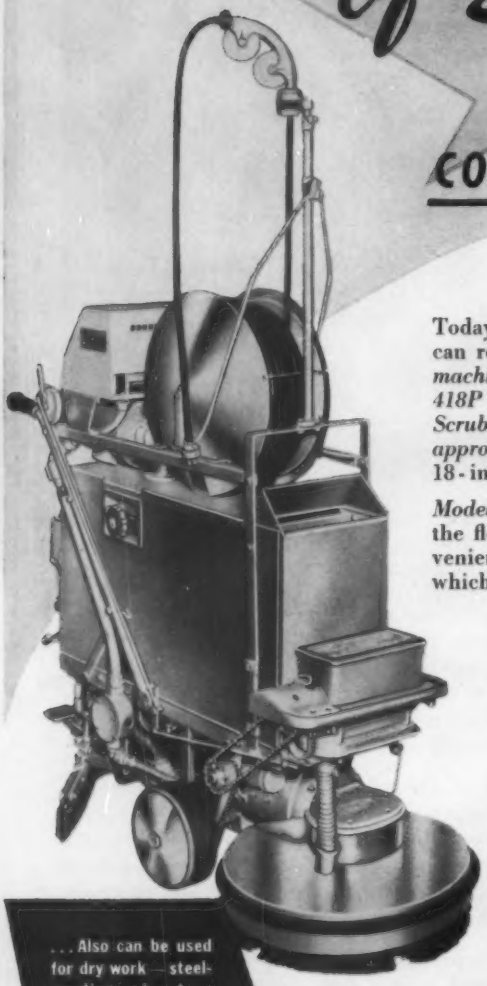
...also ACHESON COLLOIDS LIMITED, LONDON, ENGLAND

SMALL-AREA BUILDINGS...

Save 2/3 of Every Hour of Scrubbing Time

WITH A

COMBINATION SCRUBBER-VAC!



...Also can be used for dry work—steel-wooling, et cetera

Today, even buildings with but 2,000 to 15,000 sq. ft. of floor space can reap the labor-saving, cost-reducing benefits of *combination-machine-scrubbing.* Here's a *Combination Scrubber-Vac, Model 418P* at left, that's specially designed for such buildings. This *Scrubber-Vac,* which has an 18-inch brush ring, cleans floors in *approximately one-third the time* required with a conventional 18-inch machine and separate vac unit.

Model 418P applies the cleanser, scrubs, and picks up (damp-dries the floor) — *all in one operation!* Maintenance men like the convenience of working with this single unit... the thoroughness with which it cleans... and the features that make the machine simple to operate. It's *self-propelled,* and has a *positive* clutch. There are no switches to set for *fast* or *slow*—slight pressure of the hand on clutch lever adjusts speed to desired rate. The powerful vac performs efficiently and quietly. (Powder dispenser is optional.) Compactly built, the *418P* also serves advantageously in larger buildings for the care of floors in narrow aisles and congested areas.

Finnell makes *Scrubber-Vac Machines* for small, vast, and intermediate operations, and in *self-powered* as well as *electric* models. From this complete line, you can choose the size and model that's exactly right for *your* job (no need to *over-buy* or *under-buy*). It's also good to know that you can lease or purchase a *Scrubber-Vac,* and that *there's a Finnell man nearby* to help train your maintenance operators in the proper use of the machine and to make periodic check-ups. For demonstration, consultation, or literature, phone or write nearest *Finnell Branch* or Finnell System, Inc., 5303 East Street, Elkhart, Indiana. Branch Offices in all principal cities of the United States and Canada.

FINNELL SYSTEM, INC.

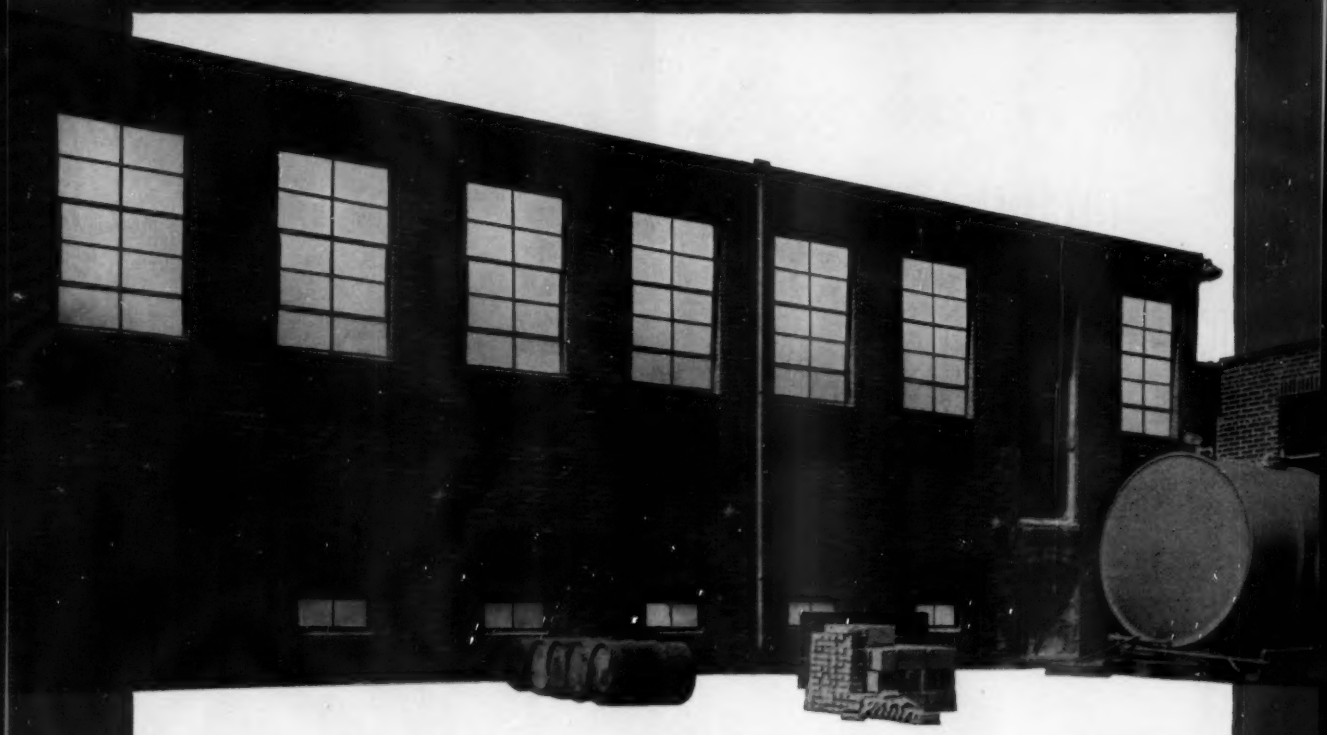
Originators of Power Scrubbing and Polishing Machines

Everything FINNELL for Floor Care

BRANCHES IN ALL PRINCIPAL CITIES

For more facts circle 551 on Reply Card

For more facts circle 552 on Reply Card——→



These Plexiglas windows save $400 a year

In 1952 the Keystone Refining Company glazed all the windows of this plant building in Philadelphia with breakage-resistant PLEXIGLAS. Recently Mr. Fred H. Detrick, president, reported: "We have not spent one cent for window replacement since installing PLEXIGLAS. Previously, breakage cost us approximately $400.00 per year."

In addition to reducing glazing maintenance costs to a minimum, PLEXIGLAS acrylic plastic:

- protects employees, machinery, and products from the dangers of broken windows.
- is available in translucent and transparent colors for the control of sky glare and solar heat.

We will be glad to send you the names of dealers in your vicinity. Local sources of supply are also listed, under PLEXIGLAS, in the classified telephone directories of many cities.

PLEXIGLAS *is a trademark, Reg. U.S. Pat. Off. and in other principal countries in the Western Hemisphere.*

Canadian distributor: Crystal Glass & Plastics, Ltd., 130 Queen's Quay at Jarvis Street, Toronto, Ontario, Canada.

Ask About PLEXIGLAS R

Our new, lower-priced cast acrylic sheet, PLEXIGLAS R, is especially suitable for industrial glazing. Ask your dealer about it, or write to us.

CHEMICALS FOR INDUSTRY

ROHM & HAAS COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Representatives in principal foreign countries

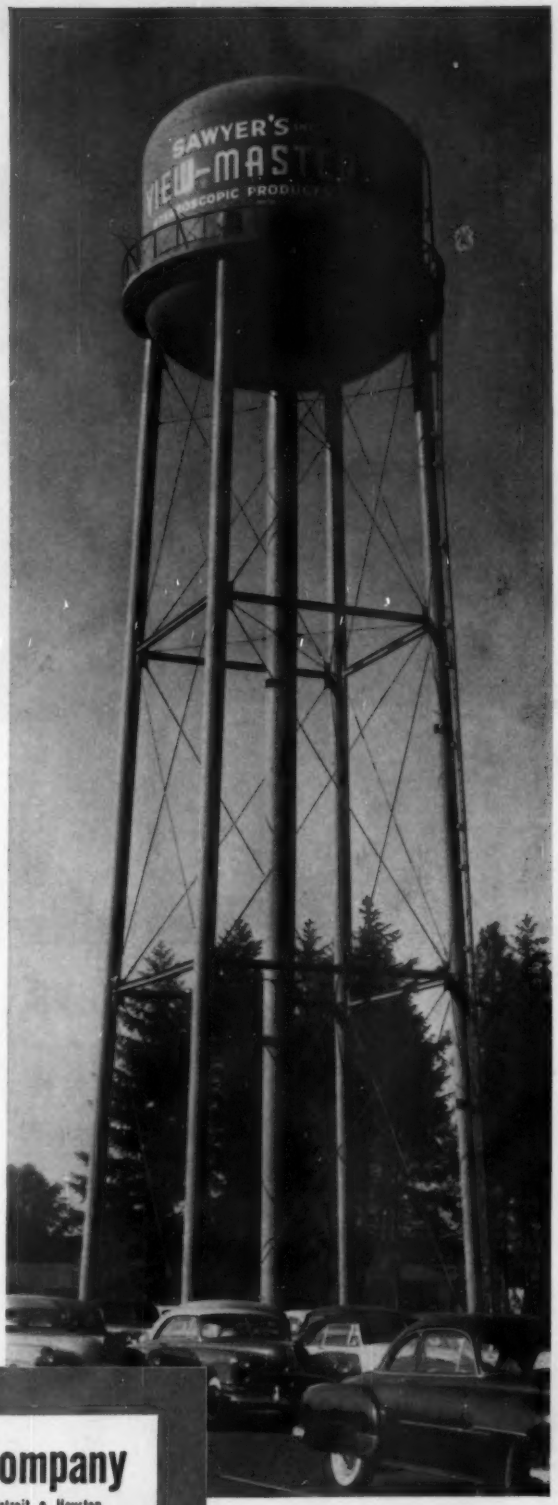
HORTON ELEVATED TANK

Guards Against Plant Enemy No. 1

Plant Enemy No. 1—FIRE—in your plant tonight could wipe it out as completely as an atom bomb!

Plant fires are frequent . . . and the first line of defense is an adequate fire protection system. Although needs vary according to plant size and conditions, one thing remains constant . . . the need for a dependable water supply. A Horton® elevated tank will provide a water supply that is always ready to flow under dependable gravity pressure the moment it is needed. Water is available day and night to quench fires *before* they become disastrous.

Write our nearest office for further information, estimates or quotations on a Horton elevated tank.



100,000-gallon Horton ellipsoidal-bottom elevated tank installed for fire protection and general service needs at Sawyer's Incorporated, Progress, Oregon.

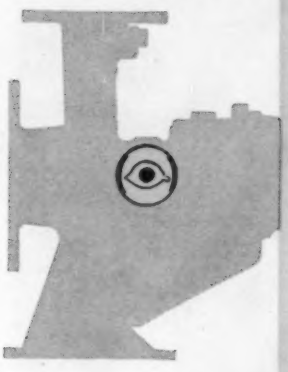
Chicago Bridge & Iron Company

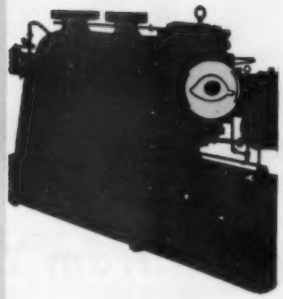
Atlanta • Birmingham • Boston • Chicago • Cleveland • Detroit • Houston
Los Angeles • New York • Philadelphia • Pittsburgh • Salt Lake City
San Francisco • Seattle • Tulsa • Washington
Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY and GREENVILLE, PA.

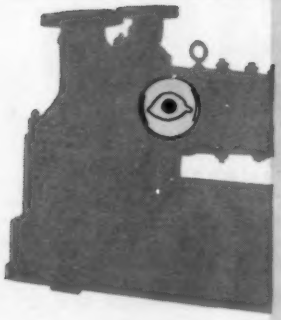
Watch your pump's Waste line

Stuffingboxes can become profit-gobbling WASTE LINES if you are using old-fashioned packing or inadequate sealing methods...

BJ Mechanical Seals







remove the waste and the worry... eliminate unnecessary leakage... prevent contamination of pumped liquid... protect against volatile liquid hazards... handle high temperatures... do away with repacking expense and repacking downtime losses. Byron Jackson makes a reliable Mechanical Seal for almost every centrifugal pump requirement. ***Byron Jackson Co.,*** *Since 1872.* P.O. Box 2017, Terminal Annex, Los Angeles 54, California, Sales Offices in Principal Cities.

You'll do better with...

For more facts circle 554 on Reply Card

from Your Nalco® REPRESENTATIVE

● Nalco Representatives make friends and permanent Nalco System users with a simple formula: honest water treatment service.

You can ask your Nalco Representative questions and get straightforward answers . . . And if you stump him, he—and you—can put the whole Nalco Laboratories' and Service staffs to work on a plain-language plan of action to get you better water treatment results, most economically.

If you are not already getting the security from water treatment troubles that regular calls from your Nalco Representative bring, call or write today for prompt action.

Nalco WATER TECHS

A paper on "A Laboratory Method for the Study of Steam Condensate Corrosion Inhibitors," presented at the 8th Annual Conference, National Association of Corrosion Engineers, has been reprinted by Nalco for distribution to men interested in this problem. Your copy will be sent free upon request.

NATIONAL ALUMINATE CORPORATION
6273 West 66th Place ● Chicago 38, Illinois
In Canada: Alchem Limited, Burlington, Ontario

THE Nalco SYSTEM . . . Serving Industry through Practical Applied Science

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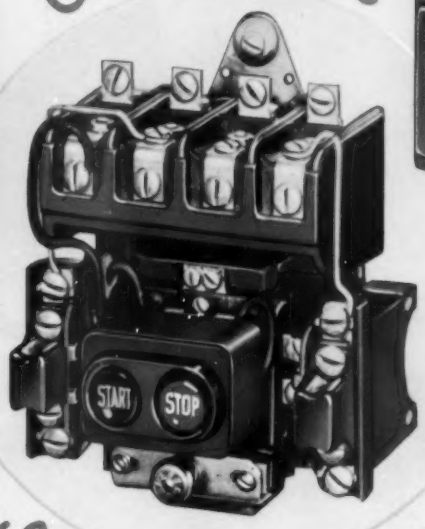
For more facts circle 556 on Reply Card——→

BULLETIN 609—
Max Rating: 5 hp,
220 v; 7½ hp,
440-550 v.

Manual or Automatic

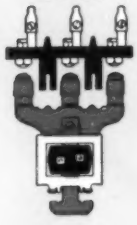
Bulletin 609

BULLETIN 709—
In 8 sizes up to 300 hp, 220 v; 600 hp, 440-550 v.

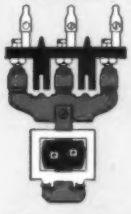


Bulletin 709-Form 1

CONTACTOR OPEN



CONTACTOR CLOSED



DOUBLE BREAK, SILVER ALLOY CONTACTS

The silver alloy used for Allen-Bradley double break contacts remains always in perfect working condition. Hence, there is no need for contact maintenance. You can install an A-B starter and forget it.

The MOST POPULAR MOTOR STARTERS Trouble Free . . . No Contact Maintenance

These two Allen-Bradley across-the-line motor starters . . . Bulletin 609 manual and Bulletin 709 magnetic . . . enjoy world-wide popularity because no matter what the service may be, they will not fail.

Both starters are simple, assuring long, trouble-free life. Both provide dependable overload protection to the motor. Both are push-button operated . . . one, mechanically through a snap-action linkage, and the other, electrically with a solenoid plunger.

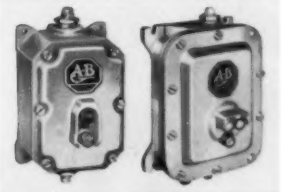
For continuous plant operation, specify either Bulletin 609 manual or Bulletin 709 solenoid starters. For maximum protection to man, motor, and machine, the Bulletin 709 is best. Its "no-voltage" protective feature prevents accidental restarting of motors after power interruptions. Write for the A-B Handy Catalog —6th Edition.

Allen-Bradley Co.
1316 S. Second St., Milwaukee 4, Wis.

•

In Canada—
Allen-Bradley Canada Ltd., Galt, Ont.

ENCLOSURES for Every Operating Condition



NEMA type enclosures are available for Bulletin 609 and Bulletin 709 starters to satisfy any operating requirement.

ALLEN-BRADLEY

MANUAL AND AUTOMATIC STARTERS

QUALITY

2-55-RM

A QUALITY STARTING SWITCH for SMALL MOTORS

Providing Reliable Overload Protection

With linkage lever & pilot light.

With standard lever & pilot light.

3-Way selector & pilot light.

With removable key switch.

NEMA Type 7 enclosure for hazardous dust or gas conditions.

NEMA Type 4 enclosure for watertight & weatherproof service.

BULLETIN 600 MANUAL STARTER

for Motors of 1 Hp or less

This compact toggle switch with a built-in overload breaker satisfies the National Electrical Code (Para. 4322 sub. C) covering overload protection requirements for motors of 1 hp or less.

QUICK MAKE & BREAK CONTACTS—The simple, rugged, over-center mechanism has a quick make and break action. No "teasing" of contacts means long contact life.

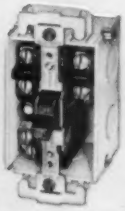
GENEROUS WIRING SPACE—Cover slips off, exposing front and both sides.

ATTRACTIVE APPEARANCE—The clean, modern lines are a sales asset to any machine. Enclosures listed for every service.

Allen-Bradley Co.
1316 S. Second St., Milwaukee 4, Wis.
In Canada—
Allen-Bradley Canada Ltd., Galt, Ont.

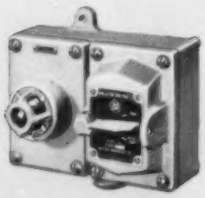
ALLEN-BRADLEY
TROUBLE FREE MOTOR CONTROL
QUALITY

Flush mounting of two Bulletin 600 starters, each with a pilot light.



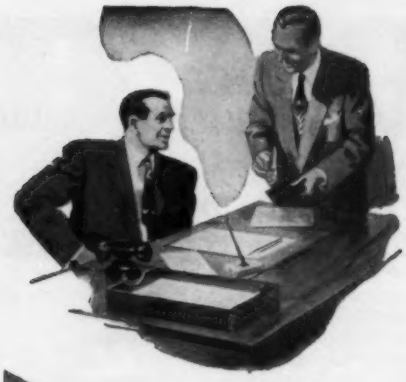
In a standard switch box.

In a surface mounted box.



NEMA Type 4 enclosure with pilot light for use in wet locations.

2-55-RM



SEE RUST-OLEUM APPLIED DIRECTLY OVER SOUND RUSTED SURFACES! MAKE THIS TEST UNDER YOUR OWN CONDITIONS AND SEE PROOF OF PERFORMANCE!

See Rust-Oleum 769 Damp-Proof Red Primer actually applied over a badly rusted surface after simple scraping and wire-brushing to remove rust scale and loose rust in the Rust-Oleum *"rusted panel demonstration."* Rust-Oleum's specially-processed fish oil vehicle *penetrates* rust to bare metal usually eliminating sandblasting and other costly surface preparations.

Rust-Oleum finish coatings in Aluminum, Green, White, Gray, Yellow, Black, Orange, Blue and others provide both *Rust Prevention* and *Decorative Beauty!* Specify Rust-Oleum for new construction, maintenance, and re-modeling. See Sweets for complete catalog and nearest Rust-Oleum Industrial Distributor, or attach coupon to your business letterhead.

RUST-OLEUM®

STOPS RUST!

There Is Only One Rust-Oleum. It Is Distinctive as Your Own Fingerprint. Resists Rain, Sun, Fumes, Snow, Heat, Salt Air, Salt Water, etc.

See local classified telephone directory under Rust Preventives or Paints for nearest Rust-Oleum Industrial Distributor.

ATTACH TO YOUR BUSINESS LETTERHEAD AND MAIL TO:

RUST-OLEUM CORPORATION

2723 OAKTON STREET, EVANSTON, ILLINOIS

- ☐ Please Show Me the Rust-Oleum "Rusted Panel Demonstration."
- ☐ Test Application of Rust-Oleum Over Rusted Metal Surfaces in My Plant.
- ☐ Complete Literature with Color Chart.
- ☐ Nearest Rust-Oleum Industrial Distributor.

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Announcing another new development...

Backed by the famous SYLVANIA money-back offer

...more power per square inch

Now Sylvania has packed more power than ever before into an eight-foot fluorescent lamp—40% more power per square inch of phosphor than the highest-powered eight-foot lamp previously available.

...maximum output area

More than 440 square inches of radiating area pour out light from this new Sylvania development in lamps—to bring you a total light output nearly 1½ times greater than existing lamps of the same size—to permit a two-lamp fixture to do the same lighting job as previous 3-lamp fixtures.

...to bring you today's most powerful fluorescent lamp

With the development of the new high-output, 8-foot fluorescent lamp, Sylvania now offers you *more light power than ever before from a single fluorescent lamp*. The new Sylvania 96", T-12, 100-watt lamp now opens up new economies for commercial and industrial installations where high light levels at low cost are a prime consideration.

AND—like all Sylvania fluorescent lamps—these new, high-output lamps are backed by Sylvania's famous money-back offer. If, in your opinion, they do not outperform your present lamps, for uniformity of performance and appearance, for maintained brightness and life—send them back with your signed certificate and Sylvania will refund the full purchase price. Check with your Sylvania supplier on the new 96", T-12, 100-watt lamp today.

SYLVANIA ELECTRIC PRODUCTS INC.
Lighting Division, Salem, Mass.
In Canada: Sylvania Electric (Canada) Ltd.
University Tower Bldg., St. Catherine Street, Montreal, P. Q.

LIGHTING • RADIO • ELECTRONICS
TELEVISION • ATOMIC ENERGY

Keep your eye on SYLVANIA

...fastest growing name in sight

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B.F.Goodrich

TIRE AND WHEEL TW ANALYSIS solves costly tire problem for Aluminum Smelting Company of Cleveland

Cutting and chipping, caused by oil and aluminum scrap, created a problem for Aluminum Smelting Company. The B. F. Goodrich Tire and Wheel Analysis man solved this problem.

Aluminum Smelting Company converts scrap aluminum to ingots. Here an industrial truck carries a load of ingots from the smelting furnace to the shipping department.

CUTTING and chipping of industrial tires, caused by aluminum scrap and oil, created an expensive problem for Aluminum Smelting Company of Cleveland. The tires on this company's fleet of 11 industrial trucks were being "chewed to pieces" after only a week or two of service.

The local B. F. Goodrich Tire and Wheel Analysis man was asked to make a study of the problem. As a result of his findings, BFG Pressed-On Deluxe Cushion tires were installed on all of the trucks. BFG's All-Purpose compounding was specified to provide resistance against oil damage and cutting and chipping.

Here's what Mr. Steve Robusky, Maintenance Superintendent of Aluminum Smelting, has to report—"These BFG tires have helped us eliminate cutting and chipping. Damage from oil has been eliminated almost completely. We have realized substantial savings in tire costs and maintenance expense."

FREE TW ANALYSIS CAN SOLVE YOUR PROBLEM

The B. F. Goodrich Tire and Wheel Analysis is a free service. Just contact your local B. F. Goodrich retailer or mail the coupon below. Without cost or obligation, a trained BFG man will study your materials handling operations. His recommendations can help you cut industrial tire costs . . . reduce maintenance expense. The advice you receive will be unbiased, for B. F. Goodrich makes a *complete* line of industrial tires for every type of service. A special TW Analysis is available for manufacturers of industrial equipment.

RESEARCH KEEPS B.F.Goodrich FIRST IN RUBBER

Specify B. F. Goodrich tires when ordering new equipment

The B. F. Goodrich Company
Tire & Equipment Division
Department TW-485, Akron 18, Ohio

Please send me:

- ☐ Additional information on your Tire and Wheel Analysis Plan
- ☐ Free copy of "Industrial Tire Guidebook"
- ☐ Free copy of "How to Get Extra Service out of Solid Industrial Tires"

Name_____

Company _____

Street _____

City _____ Zone_____ State_____

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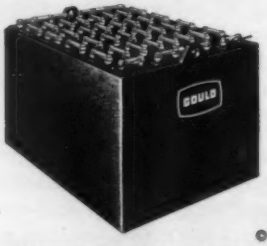
TO GIVE YOU BETTER BATTERY PERFORMANCE!

By projecting spectrographic film records on the screen of the Densitometer shown above, Gould research engineers can determine almost instantly the composition of battery metal samples and predict their performance under actual service.

Such "screen tests" together with other test procedures make sure that you get batteries with predictable performance and longer service life.

Gould research has taken the guesswork out of battery-making. Take the guesswork out of battery-buying by choosing GOULD!



America's Finest!
GOULD
Industrial Truck Batteries

©1955 Gould-National Batteries, Inc.

GOULD
Batteries

GOULD-NATIONAL BATTERIES, INC.
TRENTON 7, N. J.

"BETTER BATTERIES THROUGH RESEARCH"

Always Use Gould-National Automobile and Truck Batteries

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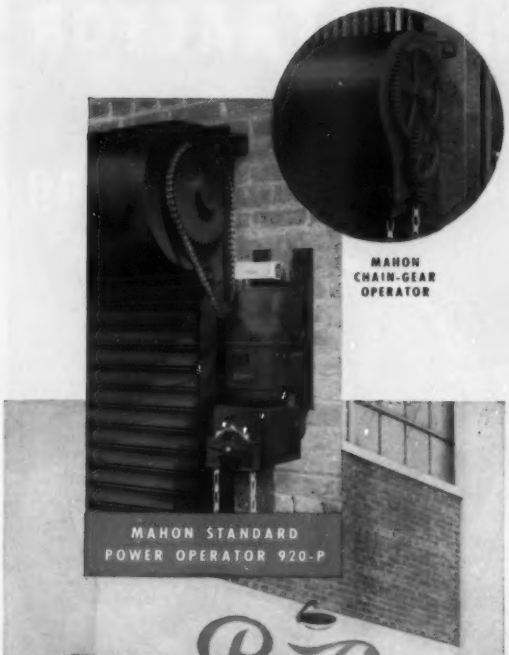
Rolling Steel Doors

Manually, Mechanically, or Electrically Operated



Rolling Steel Doors in exterior openings provide greater security than any other type of door. When these doors are closed, their interlocking steel curtains assure maximum protection against both intrusion and fire. In the installation shown below, where five new Mahon Power Operated Rolling Steel Doors provide access to an enclosed loading dock, it is impossible to open any of the doors from the outside. They can be opened only through use of normal operating controls located inside the building. Rolling Steel Doors have many other advantages . . . they are very compact—their vertical roll-up action permits use of floor space to within a few inches of the door curtain on either side. And, there are no overhead tracks or other obstructions to interfere with crane handling adjacent to door openings. A Mahon electrically operated, quick-opening, quick-closing Rolling Steel Door will save valuable space and valuable time in any type of opening. In addition, Mahon Rolling Steel Doors are permanent—their all-metal construction assures a lifetime of trouble-free service. When you select a Rolling Steel Door, check specifications carefully . . . you will find extra-value features in Mahon doors—for instance, the galvanized steel material, from which the interlocking curtain slats are rolled, is Bonderized and dip-coated with synthetic enamel which is baked on at 350° F. prior to roll-forming. You will find other Mahon features in both design and materials that add up to a greater over-all dollar value. See Sweet's Files for complete information, or write for Catalog G-55.

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MAHON

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CONSTRUCTION BRIEFS — a review of fundamentals for the plant engineer

Prepared by Byron A. Engelbach, Plant Engineer

FRAMING

GENERALLY, FRAMING involves combined loads, uniform and concentrated loads. Even though floor loading may be simple uniform loading, the supporting girders are subjected to concentrated loads from junior beams which support the joists, a portion of the uniform load superimposed on the floor and the weight of the beam itself.

Prepared tables of allowable safe loads should be used whenever possible, rather than the long formula solution. Since practically all such tables give uniform loads allowable for specific spans, it then follows that concentrated loads must be converted to an equivalent uniform load. Formulas are available for such conversion. Better still, tables similar to Table 1 are in existence which give multiplying factors that eliminate the need for formulas. Multiplying the concentrated load by the factor gives the equivalent uniform load.

Table 1. Beam position load factors

POSITION OF LOAD ON BEAM		FACTOR
FRACTION OF SPAN	DECIMAL SPAN	
1/2	0.5	2.00
1/3	0.333	1.78
1/4	0.25	1.50
1/5	0.20	1.28

From the table, a concentrated load of 800 lb applied at one-third of the span from one support will result in the same maximum bending as a uniformly distributed load of 800 lb times the factor 1.78, or 1424 lb.

This method of finding beam sizes for combined loading will result in slightly larger beams than by formula, due to the fact that the total maximum bending moment will not be equal to the sum of the individual bending moments. Therefore, when there are several heavy loads to be considered, compute the bending moment by formula to eliminate unnecessary and uneconomical oversizing of timbers.

The following is an illustration using the factors found in Table 1.

Example: Refer to Fig. No. 1. A section of roof is to support an air conditioning cooling tower which weighs 9,000 lb when it is in operation. It is feasible to support this tower on three beams spanning 16 ft, the ends of which will rest on two girders which will support the roof as well as the tower. Blocking between the joists will transmit the load directly to the girder, independent of the general roof framing. The roof load will be 8,200 lb and the tower will impose a concentrated load of 1500 lb at the points where each beam rests on the girder.

Solution: Assume the roof load a uniformly distributed load, the joists evenly spaced at 12 in. on centers. The beams, spaced at one-quarter and one-half span, impose a concentrated load of 1500 lb at each of these points.

Multiplying the concentrated loads by their proper factors, and adding all the results to the roof load will give the total equivalent distributed load.

Roof load, distributed . . .	8,200 lb
#1 Load, 1,500 x 1.5 . .	2,250 lb
#2 Load, 1,500 x 2.0 . .	3,000 lb
#3 Load, 1,500 x 1.5 . .	2,250 lb
Total	15,700 lb

The procedure for finding the size of girder required to carry the load would then follow that outlined in previous Briefs, to use the formula method. The use of tables of safe distributed loads is usually acceptable for most cases that the plant engineer will encounter. A typical table, Table 2, illustrates this short-cut method. The problem presented was only carried to the point of finding the distributed or equivalent uniform load. To determine the size of girder in Fig. 1, Table 2 will be used as follows:

Assume a depth of beam of 14 in. In the table opposite a span of 16 feet and under 14 in. find 1633. Dividing the total distributed load of 15,700 lb by 1633 equals 9.6, the width of the beam required. The nearest nominal size beam available would then be 10 in. by 14 in. For comparison, a 16 in. deep beam should be investigated. In this case, 15,700 divided by 2133 equals 7.4 and width of nominal size beam would be 8 in. by 16 in.

Nominal and actual (commercial) sizes of beams are not the same. For instance, a 2 in. by 14 in. joist is commercially sized 1¾ in. by 13½ in. The dressed sizes are generally ¼ in. scant, up to 4 in. breadth, above which they are ½ in. scant. In depth they are all generally ½ in. scant. The tabular safe load may be reduced correctly by multiplying by a factor shown in Table 3.

The correction factors are based on the proportion of the nominal size to the commercial size after substitution in the formula, $\frac{b(h)^3}{6}$ has been made.

To illustrate the use of these factors, find the safe distributed load for a nominally sized 2 in. by 14 in., long leaf yellow pine joist spanning 16 ft.

From the table the nominal size 1 in. by 14 in. joist spanning 16 ft will carry 1633 lb uniform load, therefore the 2-in.-wide joist will carry 3266 lb. This load must be reduced since the commercial size of the joist is only 1¾ in. by 13½ in. Multiplying 1633 by the proper factor, 1.63, the

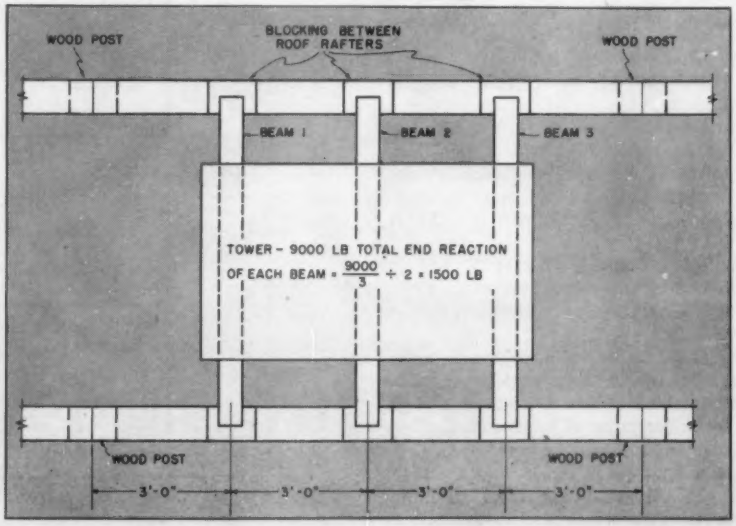


Fig. 1. Plan of basic framing to support air conditioning tower on roof structure

Table 2. Safe loads for wooden beams. S, 1200 psi; E, 1,500,000 psi. Loads above black line calculated for resistance to horizontal shear. Where two are given, upper figured for strength, lower for deflection. All loads on 1 in. wide beam

SPAN IN FEET	DEPTH OF BEAM IN INCHES						
	6	8	10	12	14	16	18
10	480	854	1333	1600	1867	2133	2400
11	437 332	776	1212	1600	1867	2133	2400
12	400 278	711 658	1111	1600	1867	2133	2400
13	369 241	656 561	1026	1437	1867	2133	2400
14	343 204	610 485	953 946	1371	1867	2133	2400
15	320 179	569 422	890 824	1280	1741	2133	2400
16	300 156	533 371	834 724	1200	1633	2133	2400

load carried will be 2661 lb, or a difference of 605 lb.

These differences in safe load capacity between commercially sized timber and nominally sized timber are appreciable and increase with beam sizes or span dimensions.

Example 2.

Refer to Fig. 3. Design the trimmers for the conditions as shown. Use long leaf yellow pine, maximum fiber stress 1200 lb per sq in; modulus of elasticity 1,500,000 lb per sq in. The floor joists have a span of 12 ft and the calculations are to be based on a joist spacing of 12 in. The trimmers are spaced at the third points of the span or 5 ft on center and span 12 ft. The headers are located at the third points of the span of the trimmers and are 4 ft on centers. The flooring weighs 10 lb per sq ft and the live load is 125 lb per sq ft.

Solution:

Step 1. Assume a 2 in. by 12 in. joist will be needed. Total load per sq ft of floor:

Joist, 44 lb per cu ft	7.33 lb.
Flooring	10.00
Live load	125.00
Total	142.33 lb.

Step 2. Find size of joist.

Total uniform load on joist = 142.33 × 12 = 1707.96, roughly 1710 lb.

Assuming several joist sizes, find the converted load which each joist will carry, based on commercially sized timber.

2 in. × 8 in. = 658 × 1.54 = 1013 lb

2 in. × 10 in. = 1111 × 1.58 = 1755 lb

2 in. × 12 in. = 1600 × 1.61 = 2576 lb

The 2 in. by 10 in. joist will be the size to use if 12 in. centers are to be maintained. From a cost standpoint, 16 in. centering of joists calls for less labor, and should be considered. The joist must carry 142.33 × 1.33 × 12, or 2277 lb. From the tables, a 2 in. by 12 in. joist which will carry 2576 lb will suit the case. This is on the safe side by 300 lb but indicates that the 2 in. by 10 in. is the best suited and in accordance with the problem.

Step 3. Find the header size.

The joist carried by the header spans a distance of 4 ft and the header spans

Table 3. Correction factors for sizes

CROSS SECTION IN INCHES	FACTOR	CROSS SECTION IN INCHES	FACTOR
1-3/4 x 5-1/2	1.47	1-3/4 x 11-1/2	1.61
2-3/4 x 5-1/2	2.31	2-3/4 x 11-1/2	2.53
1-3/4 x 6-1/2	1.51	1-3/4 x 13-1/2	1.63
2-3/4 x 6-1/2	2.51	2-3/4 x 13-1/2	2.56
1-3/4 x 7-1/2	1.54	1-3/4 x 15-1/2	1.65
2-3/4 x 7-1/2	2.42	2-3/4 x 15-1/2	2.58
1-3/4 x 9-1/2	1.58	1-3/4 x 17-1/2	1.65
2-3/4 x 9-1/2	2.48	2-3/4 x 17-1/2	2.60

5 ft. Therefore the total uniform load on the header will be: 5 × 4/2 × 142.33 or 1423 lb.

For practical purposes this header should be the same depth as the joists or 12 in. We already know that this joist will carry 1600 × 1.61, or 2576 lb on a span of 12 ft. Therefore the joist is quite safe for the service.

Step 4. Find the size of the trimmer.

The trimmer will be called upon to support combined concentrated loads of 1423/2 or 712 lb from the headers at the ⅓ points of the total span and a uniform load 6 in. wide × 12 ft long × 142.33 or 855 lb. On the side of the trimmer where the opening occurs there will be two separated uniform loads, each 6 in. × 4 ft × 142.33 or 285 lb. These loads wil be treated as concentrated loads at the center of ⅓ of the span or at the 1/6 of span points. Assuming that the trimmer might be a 3 in. by 12 in. timber, the uniform load caused by the trimmer would be ¼ of 44 lb or 11 lb per running foot. Since 7.3 lb of this load has already been allocated in the 142.33 lb per sq ft of floor load it is safe to neglect this additional nominal load.

The equivalent uniform load must be found as follows:

Uniform load	855 lb
Conc. load trimmer A (712 × 1.78)	1267
Conc. load trimmer B (712 × 1.78)	1267
Conc. load for U.L. A (285 × 1.115)	318
Conc. load for U.L. B (285 × 1.115)	318
Total equiv. load	4025 lb

This trimmer should hold to the depth of the joist, if possible. Therefore try a 3 in. by 12 in. timber and from the table find that for a 12 ft span, a 1 in. wide beam will carry 1600 lb. Corrected for commercially sized timber, 4048 lb is the load it will carry. The timber is safe.

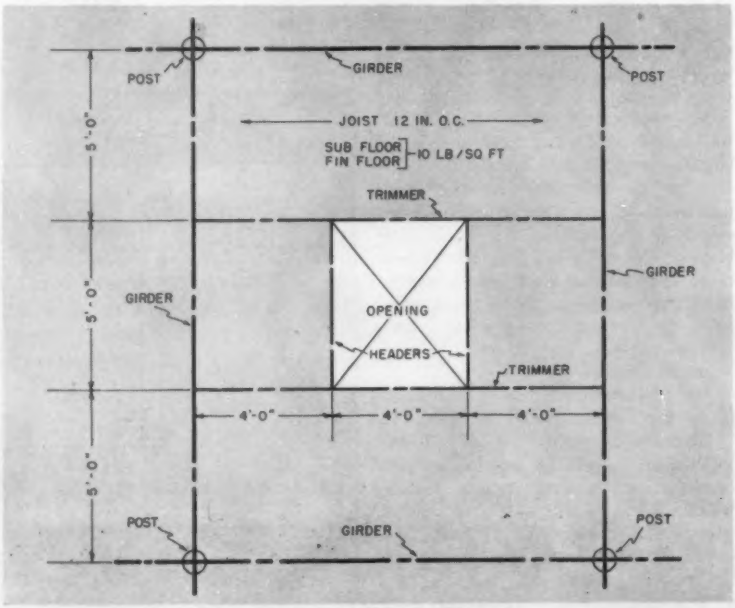
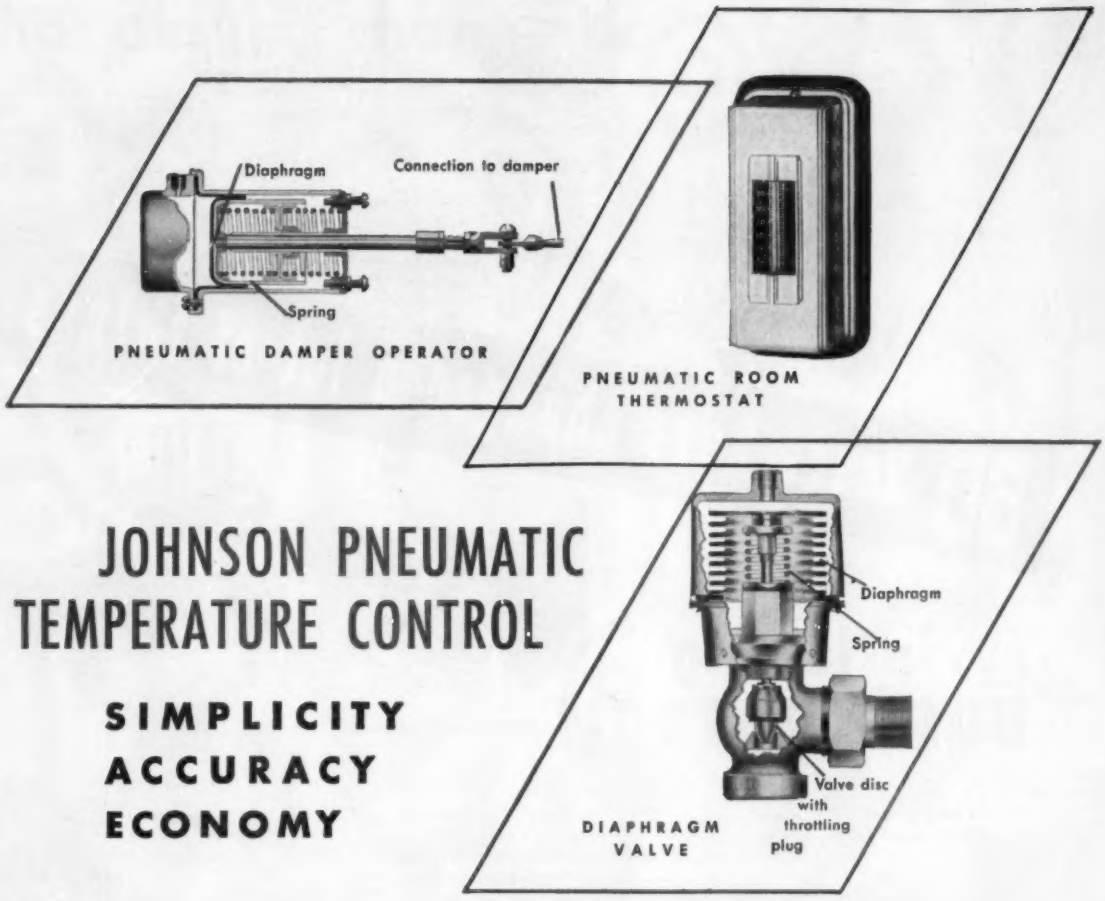


Fig. 2. Line diagram of structural framing using trimmers in flooring supports



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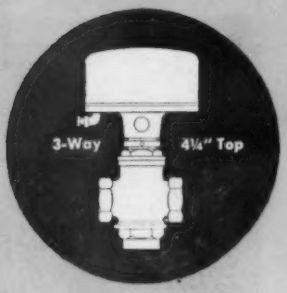

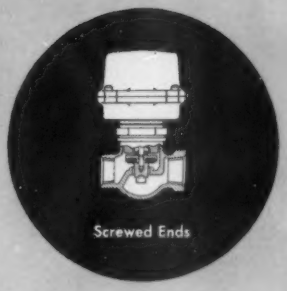

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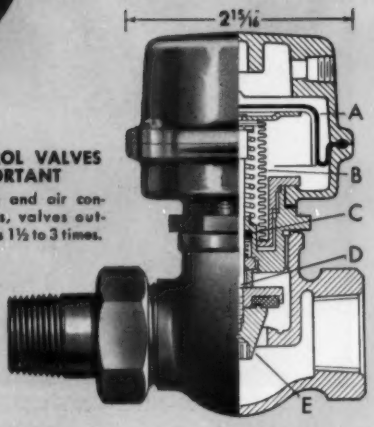

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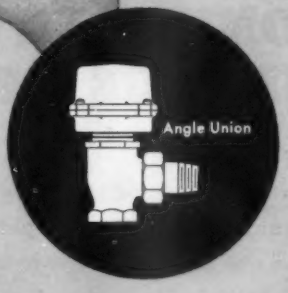

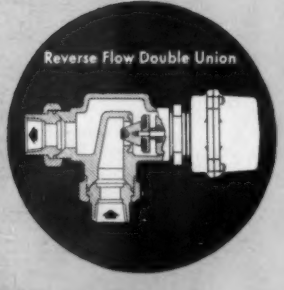

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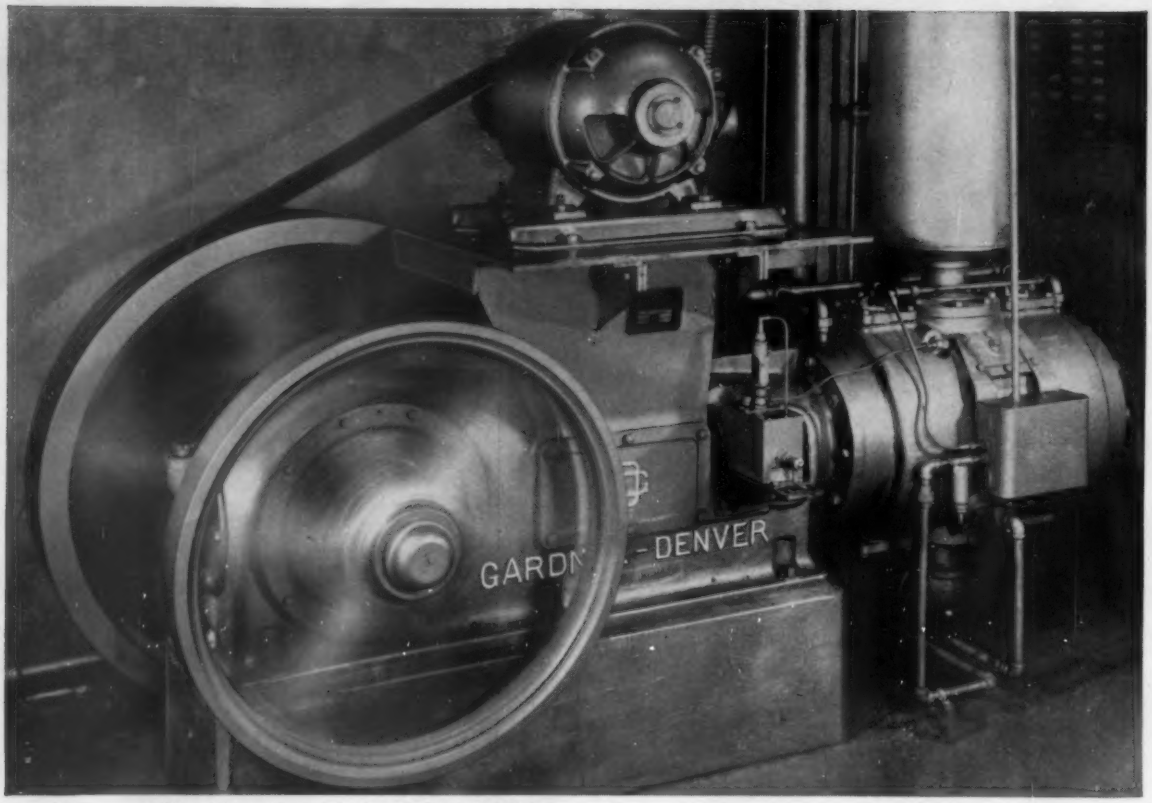

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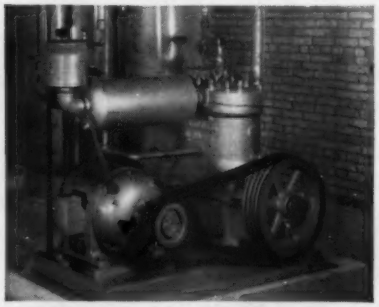

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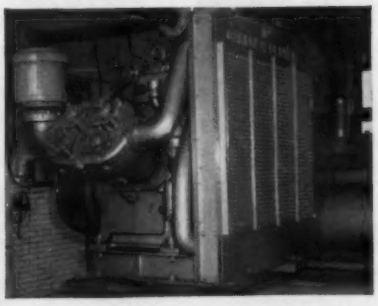

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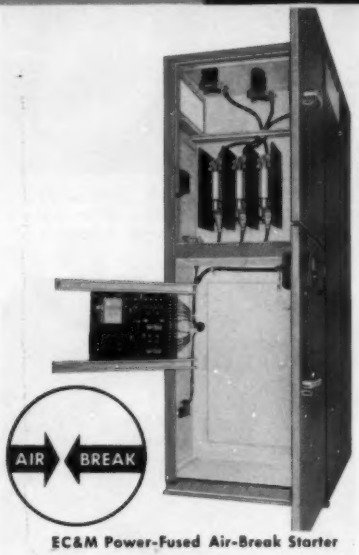

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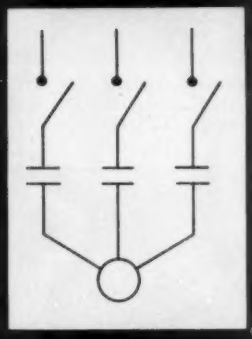
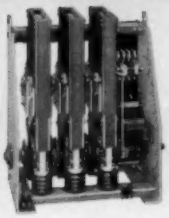
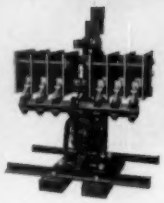




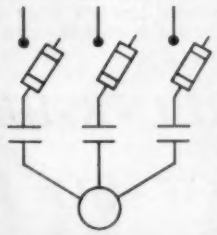
50,000 KVA, 200-ampere ZHA Contactor, all contacts easily accessible



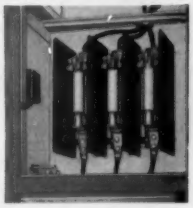
50,000 KVA Oil-Break ZHS Contactor provides double-break in each of 3 lines

2. POWER FUSES

150,000 KVA at 2300 VOLTS
250,000 KVA at 4800 VOLTS

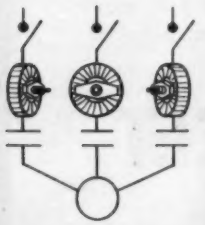


POWER FUSES used with Oil and Air-Break Starters pivot at the bottom to secure as a means to disconnect the complete starter.

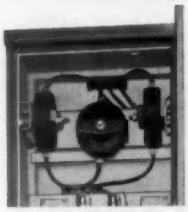


3. VALIMITOR

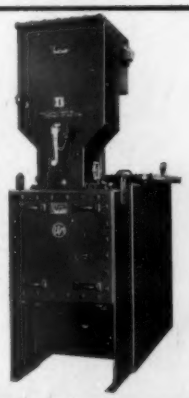
UNLIMITED KVA BUS



VALIMITOR Starters have air-core reactors which limit infinite kva to a finite value, easily cleared by the oil or air-break contactor.



FOR HAZARDOUS LOCATIONS, the Type VIII Starter with self-contained oil disconnect switch is shown at right. Starters also available for semi-hazardous areas.



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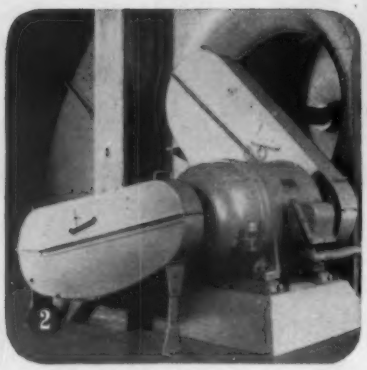

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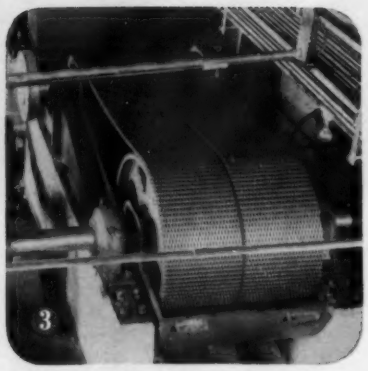

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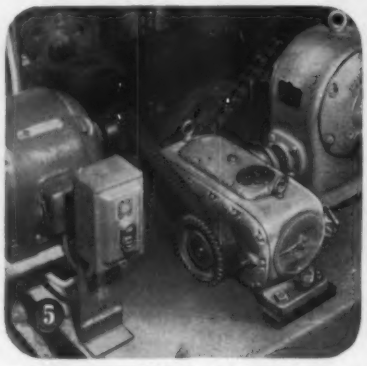

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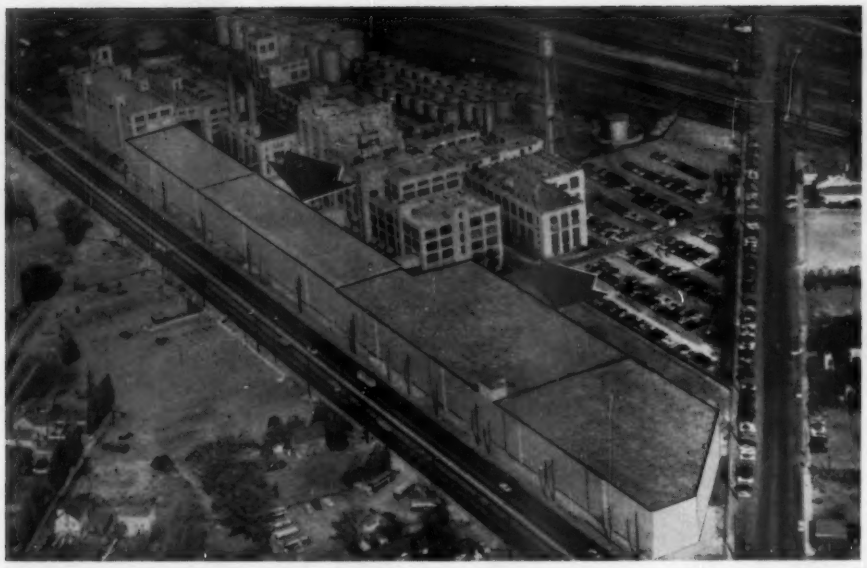


Fig. 1. Aerial view of Lever Bros. plant. Arrows point out the new warehouse addition

Precast Construction

Plays Major Role in Erection of Lever Bros. New Warehouse

By E. F. HANFORD, Plant Engineer, Lever Brothers Co., Hammond, Indiana

MANY INTERESTING time-saving ideas were employed during the construction of our new warehouse in Hammond, Indiana.

The warehouse project occupies an area of about 5¼ acres, and together with an existing warehouse building extends along Indianapolis Boulevard for a length of 1,527 ft. The combined warehouse has a floor area of over 500,000 sq ft. The west section of the building occupies the space between existing buildings and Indianapolis Boulevard. This part of the warehouse is 93 ft wide between columns, 130 ft wide overall, and is of three-story construction with 15 ft spacing between floors. East of the three-story section, the warehouse spreads out to a width of 177 ft between columns, two stories high. The floor spacing in the two-story section is 20 ft so that the height of the two- and three-story sections is approximately the same.

It is built on a monolithic concrete design except for the upper stories in the two- and three-story sections which are of precast construction, columns, beams and purlins. The spandrel walls are all precast slabs on the north side with brick faced concrete block spandrel walls on the Indianapolis Boulevard side.

The original Hammond plant was built with spread footings on sand and with a water table 42 in. below grade so that the plant is partially waterborne except in very special areas where piling is used. Bed rock is about 100 ft below grade, the intermediate strata being in alternate layers of sedimentary sands and blue and yellow clays.

Good clean bearing sand was found at about 4 to 6 ft below grade. Because of the size of the spread footings, it was found to be more economical to completely remove the overburden to the footing bottom grade. With no storage space available on the site, it was necessary to dispose of the excavated material outside the plant.

Since the generally accepted height of a warehouse dock floor is 4 ft above grade to accommodate box cars and trucks, it was necessary to back-fill 8 to 10 ft deep over the entire area with new fill. Existing warehouse floors which had been poured over sand fill had the objection that although the sand had been thoroughly soaked and settled before pouring the slabs, we had found places where the fill had run out from under the slab, leaving the slab unsupported. This was particularly true at the external sections where undermining had occurred as a result of ground water disturbances or vibration. Granulated slag which solidifies over a period of time would obviate this condition.

Being in the neighborhood of the steel mills, sufficient amounts of slag

Fig. 2. Nicknamed "Dinosaur," mobile lift crane is raised to the second floor

Fig. 3. Workers prepare necessary framework for wall panel sections. Where possible the precast wall slabs were constructed alongside their final positions

Fig. 4. After attaching lifting pad and shackles, panels are ready, and . . .

Fig. 5. . . . the "Dinosaur" takes over and raises the wall panel section

were available and it was decided to use this material for subgrade back-fill and for the above grade back-fill under the first floor slabs. While granulated slag has been in use in the Calumet Region for blast furnace and other foundations, it had never been used for a complete floor foundation of the type to be used in the new warehouse and the proper method of compaction was a problem. Granulated slag cannot be settled by flooding as with sand, and reliable information on compaction by rubber-tired vehicles or rollers was not available.

The solidification slag is a result of a mechanical interlocking of the particles. The separate pieces or grains of slag are very irregular and sufficient compaction must be applied to compress the particles together sufficiently to cause the interlocking of the irregular forms. Too heavy compaction breaks the particles up and defeats the purpose. The interlocking or solidification of the particles is sufficient to result in a certain amount of arching in the upper layers.

After the slag has solidified, there is sufficient horizontal shear resistance in the supporting slag to accommodate concentrated loads on the slab without deflection. It was essential to obtain sufficient compaction of the slag to maintain contact with the poured concrete slab. The ground floor slab became in effect a concrete roadway, supported on a slag base. The slab floor was poured in sections about 25 ft square with combined contraction, construction and expansion joints.

The bugaboo of pouring slabs on fill without continuous reinforcement is the curling of the slabs at the edges. For all practical purposes, no matter what a ground floor slab is designed for, the operators will consider the load capacity unlimited. This means that extreme care must be exercised in installing the first floor slabs. Most of the ground floor slabs were poured in warm weather so that during the curing period the natural curl resulting from differences in moisture content of the tops and bottoms of the slabs was counter-acted by high surface temperatures.

Moisture content of the slag base was carefully controlled and the top surfaces of the slabs kept wet for a week or so after pouring. Slabs were poured about 1/16 in. high in the middle. These methods resulted in a floor with no curling and an absolutely smooth, even surface. The work of installing the slag fill was interrupted from December 15 to March 15 to avoid the possibility of frost in the fill under the slab floor.

How Column Piers Were Poured

After the spread footings were completed, the column piers except at the outside walls were poured up to the first floor grade. All of the grade beams were precast on the sub-grade. This meant that the top surface which had been troweled to a smooth finish, could be used for the exterior surface of the grade beams. Undersides of the precast beams were rough and were used to back up the fill. The outside piers were poured last after the grade beams had been set in place and cured for about 30 days. This procedure minimized cracking at the joints between piers and grade beams. After completing the pouring of piers between the grade beams, the slag fill was compacted and the ground floor slab poured.

Above the ground floor, the building is of composite construction. The north side of the building facing the existing plant is of precast construction while the south side facing Indianapolis Boulevard is concrete block, faced with buff brick, the latter being used to conform with the existing plant.

Mechanization was utilized as far as possible to increase the speed and efficiency of the work and to lower the cost. This was true both in pouring the slabs and columns and in handling the precast work. Since much of the slab was 13½ in. thick, with 21 in. drop panels, it was necessary to handle large quantities of concrete rapidly.

All concrete was ready-mixed and deposited in place with a minimum of chuting to avoid segregation. Cranes and skip hoists were used to raise the mix to the floor level. Rubber-tired hand and motorized buggies were em-

ployed to move the concrete horizontally. Since much of the warehouse was erected between the existing plant and the heavily traveled boulevard with access at each end only, it was necessary to carefully work out the details of placing the concrete mix. Some of the horizontal runs were 150 ft and over, and dry runs were necessary to work out the timing and scheduling of the work. One gang of men could place and finish an average of 200 yards a day, but in cooler weather the finishing might run into overtime.

The most interesting part of the work was the erection of the wall slabs. Many of these slabs measured 20 ft by 25 ft and weighed upwards of 20 tons each. These slabs were 5½ in. thick with No. 4 bars on 12 in. centers. Some slabs had openings which cut through the bottom leaving slender standing legs. The wall slabs were poured directly on the concrete floors, using a parting compound so that only the top surface required finishing.

Where possible the wall slabs were constructed alongside their final positions. In such cases, the finished slab was tilted up by a crane and moved into position. Special nuts were cast in the wall and floor slabs for attachment of braces to hold the wall slabs temporarily in position while the columns were boxed in and poured. The vertical wall slabs were allowed to cure for several weeks before pouring the columns to minimize contraction cracks.

Tilting up the slabs was a ticklish job since the wall slabs themselves had no bending reinforcement. Considerable skill was needed in the tilt-up operation. The heaviest slab weighed 20 tons, but this weight was not always the governing factor since the suction or adhesion of the bottom of the poured slab to the base slab could be many times the weight of the slab.

Once the suction was broken, it was necessary to maneuver the slab evenly to a vertical position since any pause in this operation could result in a broken slab because of excessive bending stress. Some slabs which could not be poured close to their final position in the wall had to be jockeyed hundreds of feet from the position in which they were poured to their final locations. Maneuvering a 20-ton slab suspended from a crane jib through construction timbering and other obstacles in a high wind was a tricky proposition. The fact that the tilted-up slabs were exposed to 60-80 mph winds before being finally concreted in place testified to the complete adequacy of the slab design and slab bracing.

Various types of mobile cranes were used to handle concrete, lift the slabs, and reinforcing steel. One unusual piece of equipment, designed and built by Le Tourneau, was dubbed "Dinosaur" by the workers on the job. The larger unit had a capacity of 20 tons at a 25-ft radius and a straight lift capacity of 75 tons at a factor safety of about 2. This equipment has to be seen to be appreciated, but the novel features consist of unit motorized windlasses located at various points on the frame, with motors wired to a large motor generator set under the hood.

14 Slabs Erected in One Day

These units were raised to the second and third floors for the erection of the wall slabs, precast columns, beams and purlins. On a record day, 14 large slabs were erected with one of these cranes.

At Hammond, the multiple story warehouse was a natural development of the original plant. The bulk of the merchandise produced at Hammond is finished and delivered on conveyors on the third floor. Gravity conveyors move the product into box cars or storage on the first floor.

It became very apparent in the early history of the plant that a warehouse on the property would be a convenience since much of the plant production had to be shipped to metropolitan warehouses for distribution. Gravity conveyors which transferred the product from the third floor to box cars could be easily connected by conveying systems to an on-the-property warehouse. In the finished warehouse, the floor grades of the three-story section are identical with existing plant grades and three bridges have been installed over the railroad tracks between the old and new buildings for transporting packing materials and other raw materials from the new warehouse into production. The product conveying systems are installed beneath these bridges to move the product directly from production into the new warehouse.

Conveying systems, designed and built by the Lamson Corp. of Syracuse, N. Y., handle all products entering the warehouse from production. This includes margarine, shortening, and the various bar and flake soaps. The soap produced is handled by one conveying system with its sorting and accumulating conveyors and pallet loaders, and the edible production is handled by an entirely separate system of conveyors.

In each system, the cases entering the new warehouse are sorted by electric eyes and collected on a group of accumulating conveyors. When the proper number of cases has been accumulated on its conveyor, the pallet loader automatically loads the cases on pallets and delivers them to locations on the first and second floors where fork trucks pick up the loads and move them to storage or into warehouse cars.

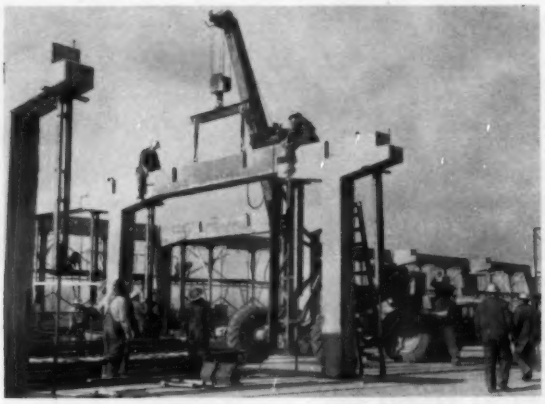
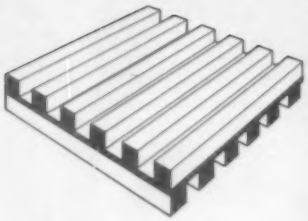


Fig. 6. Precast columns and beams, poured on the job, are set in place with the help of special lifting equipment

Fig. 7. Some slabs for the loading dock had openings cut through the bottom. It was a ticklish job handling these slabs



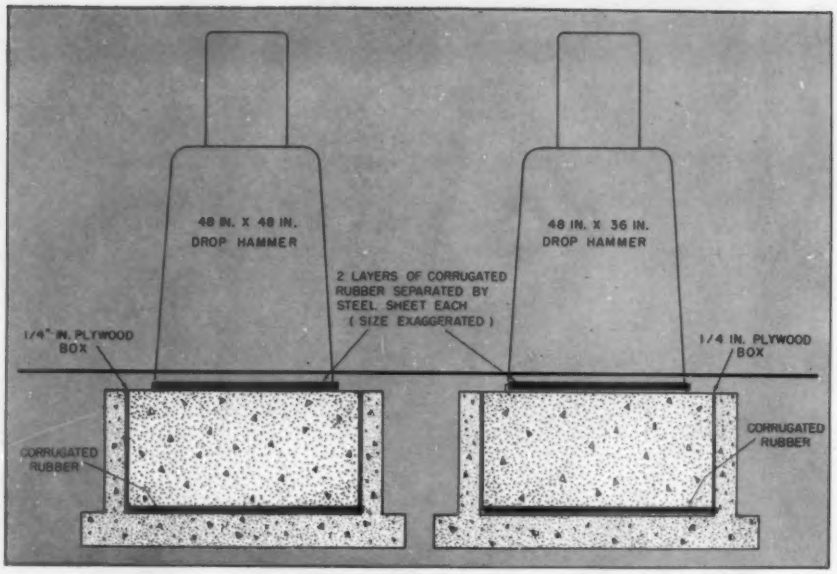

48 IN. X 48 IN.
DROP HAMMER
48 IN. X 36 IN.
DROP HAMMER
2 LAYERS OF CORRUGATED RUBBER SEPARATED BY STEEL SHEET EACH
(SIZE EXAGGERATED)
1/4" IN. PLYWOOD BOX
1/4 IN. PLYWOOD BOX
CORRUGATED RUBBER
CORRUGATED RUBBER

Fig. 1. Sectional elevation of the hammer installation showing location of the rubber-in-shear and the ¼ in. clearance between the inertia blocks and concrete box

Corrugated Rubber Is What Piasecki Used for

Effective Drop Hammer Isolation

Plant visits, manufacturer recommendations, advice from other plant engineers, plus a scale model, and actual tests, went into the planning of this successful drop hammer isolation project . . . Sensitive and delicate operations nearby have been unaffected by the hammers' operation, testifying to its effectiveness

By HOWARD B. JONES, Facilities Engineer, Piasecki Helicopter Corp.

ECONOMICAL AND effective control of harmful vibration caused by drop hammers has been sought ever since the development of the drop hammer. Recently, Walter F. Swartz, Plant Engineer, Piasecki Helicopter Corporation, Murton, Pa., directed me to make a study of the subject with the stipulation that the ensuing installation be as close to perfect as was economically justified.

Working under the immediate supervision of Jack E. Weber, Plant Facilities Supervisor, I visited many plants where drop hammers were installed. Further, prints of foundations were requested from firms that could not be visited. All plant engineers contacted were most cooperative and because of this, it was possib'e to make a factual analysis of foundation methods and to reach some sound conclusions.

Generally, it was found that hammers were located in buildings devoted solely to their use. This condition resulted in wasted floor space. Harmful vibration, however, precluded locating other industrial processes in the proximity of hammers. In some cases floor failures had occurred and in one particular case a 6-in. reinforced concrete floor had been so damaged by shock that holes, measuring 2 ft and 3 ft in diameter had appeared in it. Other detrimental effects varied from neighborhood complaints to worker grievances. In one instance there had been complaints on the part of a railroad because they felt that the roadbed outside a plant was being adversely affected by the vibration from the hammers.

Further analysis on our part revealed that inertia blocks mounted directly on soil were particularly ineffective although this is the least costly foundation technique from a purely initial cost aspect.

Simultaneously, tests were conducted in our laboratory to determine the feasibility of using corrugated neoprene pads as a means of controlling vibration. After numerous experiments, proper loading was determined in order to preclude an inherent resonant effect. Other products of simi-

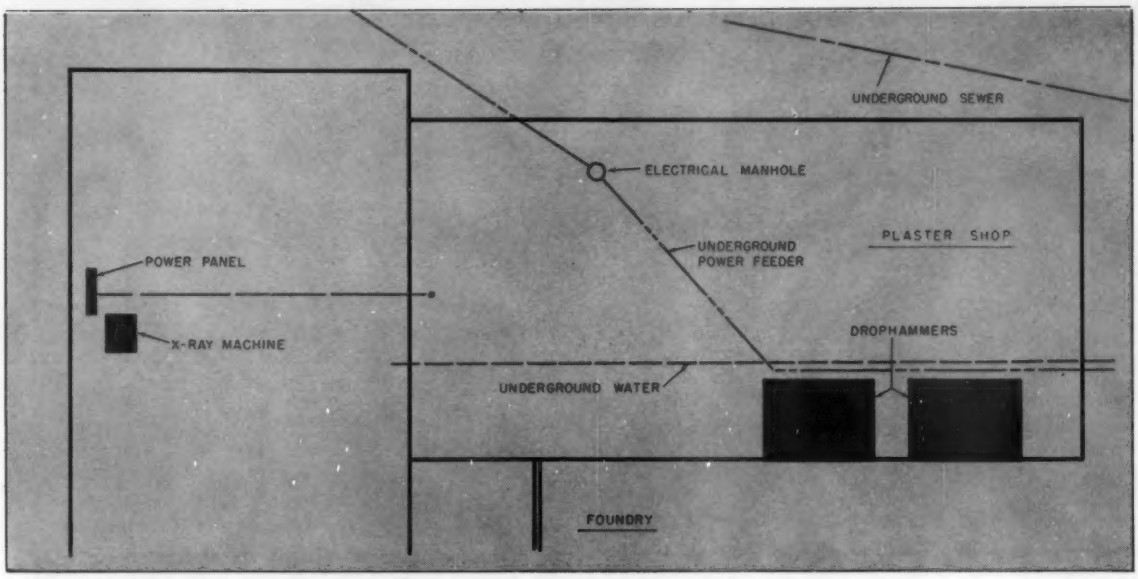


Fig. 2. This plan view shows the location of the facilities and utilities that could have been adversely affected by the drop hammers had they not been installed correctly and isolated completely. A plaster molding operation is nearby, too

lar nature were investigated and a selection was made.

With these facts the foundation designs were started. Naturally, a soil study was made to determine conditions. Space limitations resulted in our being allotted 627 sq ft for two hammers. Of this, 264 sq ft were required for aisle space leaving a total of 363 sq ft of usable space.

Additional adverse conditions existed that affected the design and practically dictated the degree of vibration control necessitated. A township 18 in. sanitary sewer ran about 30 ft from the hammer foundations as shown in Fig. 1. An X-ray machine for photographing castings was located 76 ft from the nearest hammer site.

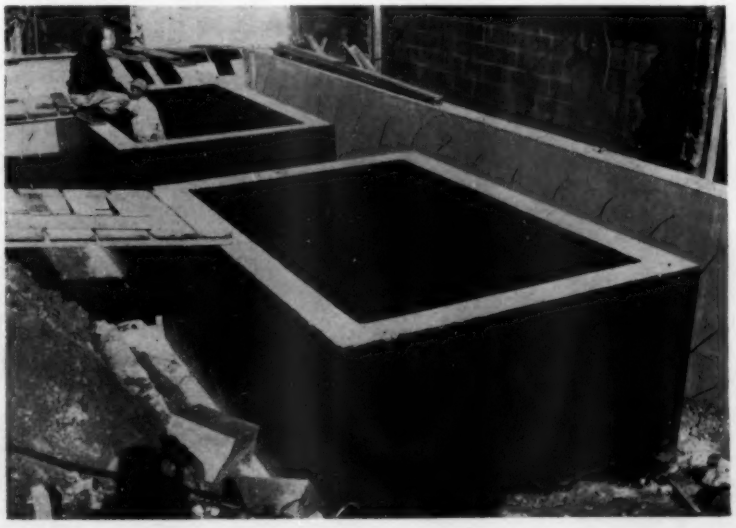
Difficult Conditions

A 6-in. water pipe, and an electrical feeder, ran underground parallel to the hammer foundations. These were located approximately 2 ft from the hammers. Out plant maintenance shop and offices are located in an adjoining building. The floors of this building are about 4 ft below the floor of the hammer shop.

These conditions, which were vexing to say the least, were crowned by the requirement that the plaster molding shop be moved into the hammer shop and located in the area immediately adjacent to the hammers; in fact, a plaster forming table was scheduled to be placed and used just 3 ft from the nearest hammer foundation.

The designs were completed and the foundations were constructed. In general the design called for a concrete box to be constructed with the upper surface of the base covered with corrugated neoprene pads. After curing, the inertia block was poured in the box so that the sides of the block were clear of the inside of the box by ¼ in. of free space and in such a manner that the base of the block did

Fig. 3. Construction view of the two boxes which were used to hold the inertia blocks upon which the hammers rested. See next page for interior view of the box



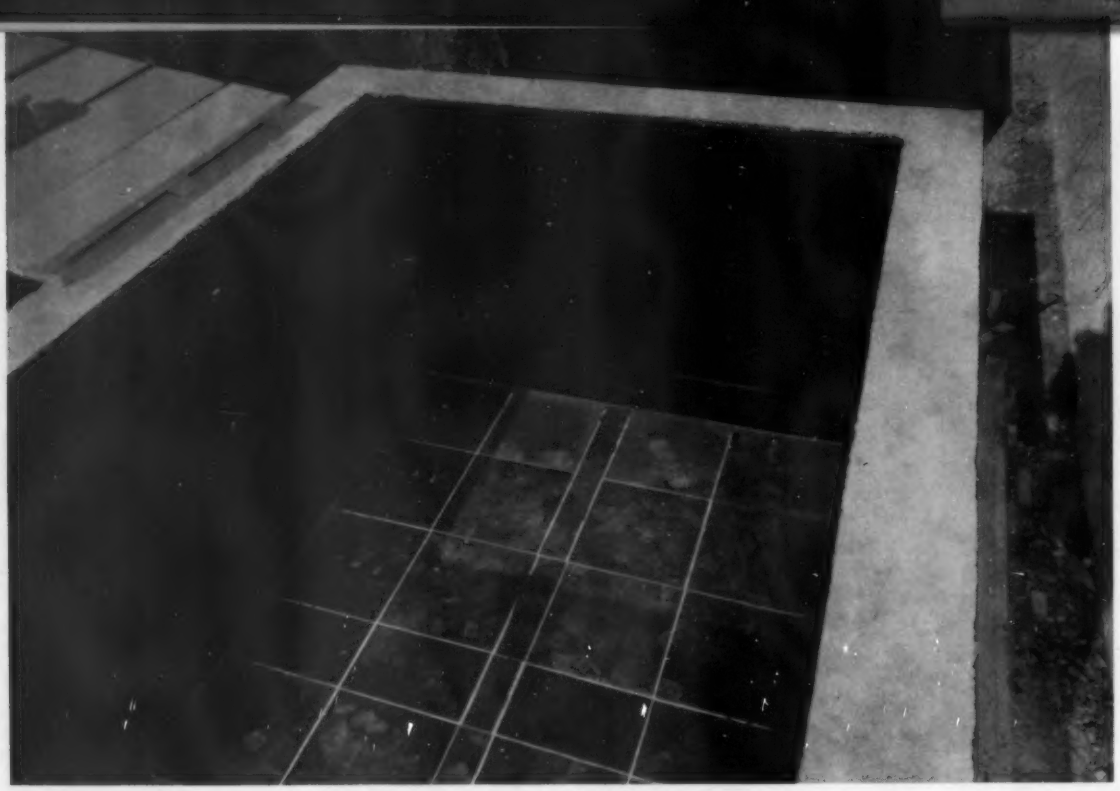


Fig. 4. Interior view of one of the two boxes shown on the preceding page. Note particularly the corrugated rubber in the bottom of box. It was upon this that the inertia block rested. There is ¼ in. of space between block and sides of bar

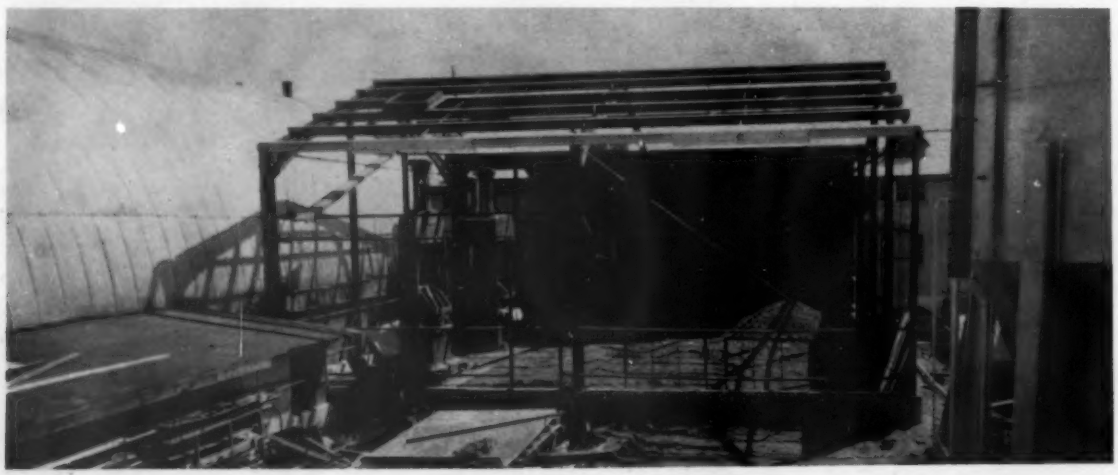
not interfere with the corrugated effect of the pads. This was accomplished by constructing a plywood box inside the concrete box.

Two layers of pads separated by a steel sheet were placed on top of the block and in turn the hammer was mounted on the double layer of pads. The hammers were not bolted down nor was it necessary to restrain them laterally. Rene Sainson, who worked with me on the planning phase, designed a clear span frame to support the working platform.

In theory, our design intends that the force dissipate itself against succeeding damping effects. While all the kinetic energy of motion is not completely converted into potential energy, the spread footing of the base and the underlying soil were considered in arriving at the design. This remaining kinetic energy, however, is so slight that it was possible to locate plaster tables and the x-ray machine as originally planned. The plaster tables and x-ray machine are worked without regard to the operation of the hammers. It has been found that while the dynamic disturbance in the soil caused by the hammers produced stress waves they have not been sufficient to affect water lines, electrical feeders, or the sewer line. This is particularly noteworthy since the hammer foundations sit directly upon an incompletely consolidated sandclay formation. Vertical and horizontal positions remain unaltered after about nine months' operation.

Most important, the cost of materials, labor and equipment to construct our foundation was probably not greater than 12 per cent of the cost indicated by estimates.

Fig. 5. Early view of construction of the building designed to house the two hammers and the plaster molding operation



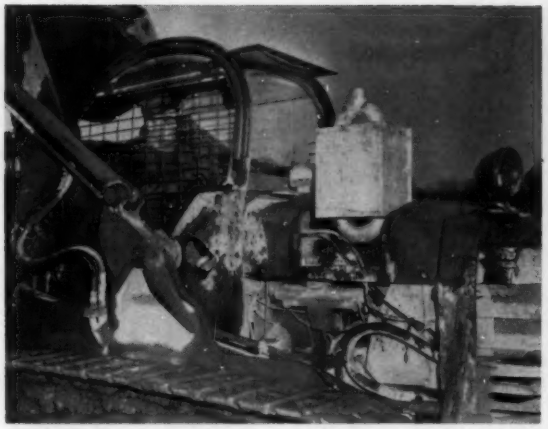


Fig. 1. Tractor mounts catalytic purifying unit vertically

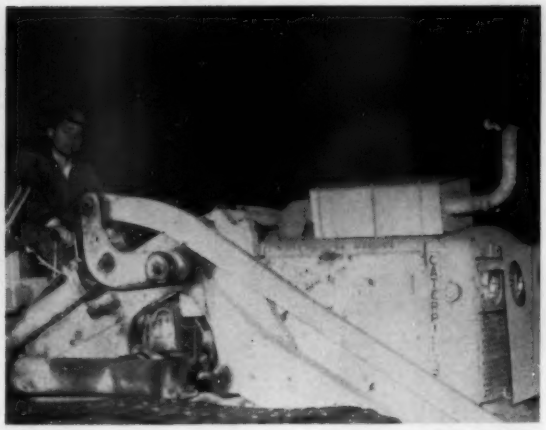


Fig. 2. Larger tractor mounts purifying unit horizontally

Diesels Take the "Bad Breath" Cure

With new catalytic mufflers cleaning up their exhausts, diesel tractor-shovels go underground . . Additions to mine "fleet" are versatile . . . Operating above or below ground, they don't foul the air . . . Miners work in air that is safe and odor-free

PIONEER in the introduction of Portland Cement in 1871, and the development of the rotary kiln, the Coplay Cement Mfg. Company, Coplay, Penna., is also the first to adapt standard open-air diesel and gasoline powered motors with catalytic exhausts for underground operation.

The attachments, developed and manufactured by Oxy-Catalyst, Inc., Wayne, Penna., oxidize the noxious carbon monoxide and irritating hydrocarbons from the engine exhausts into harmless carbon dioxide and water. The device is furnished in two types—an OCM catalytic exhaust for gasoline or LPG engines and the Dieseler for 4-cycle diesel equipment.

The more recent Dieseler was first used by Coplay on an International Lodover tractor-shovel. A few months later, another tractor-shovel, a Caterpillar D-6 shovel, was equipped with a Dieseler and, about the same time, two 8-ton Dodge dump trucks were fitted with OCM exhaust units. All four pieces of equipment are operated underground with no complaints from miners about odors, eye-irritation, nausea or other symptoms of fumes.

Coplay estimated that the catalytic mufflers have saved thousands of dollars in equipment expenditures. Both the Lodover shovel and the Dodge trucks had been used previously for above-ground operations at the company limestone quarry. Therefore the only additional investment to make them useful for underground work was the cost of the catalytic mufflers. The Caterpillar, although an additional purchase, cost considerably less than special underground equipment of equal capacity and efficiency.

Even with continuous operation of the diesel equipment, carbon monoxide concentrations in the working areas have been consistently below 0.003 per cent, which is well under the Bureau of Mines allowable maximum of 0.01 per cent for an eight-hour exposure.

Odor Removed, Too

The mufflers are doing just as thorough a job in cleaning up hydrocarbon fumes — the irritating, odor-causing components of engine exhausts for which the diesel is particularly notorious. Coplay reports no irritating odor or smoke from its equipment, even when operated in dead-end headings 1000 ft from the mine entrance.

Both types of mufflers are connected directly to the engine exhaust manifold and can be quickly installed by any mechanic. The basic unit of both systems is a cartridge of 73 evenly-spaced porcelain rods, coated with catalytic alumina and platinum alloy. Depending upon the size of the engine, two or more of these units are placed in series in a metal container. As the exhaust gases pass over the porcelain rods, the catalyst oxidizes the contaminants, leaving the exhaust harmless.

In both units, the catalytic cartridges are enclosed in a heavy-gage steel shell. The Dieseler has an outer layer of magnesia insulation to insulate the unit and bring the temperature to the point where catalytic reaction of the carbon monoxide and hydrocarbons with oxygen in the air can take place.

One Dieseler unit is a twin-flow assembly containing eight catalytic sections and with overall dimensions of 7 in. by 12 in. by 27 in.; the other contains 16 catalytic sections, and measures 8 in. by 14 in. by 42 in. In both cases, the units are mounted atop the engines.

Initially, Coplay purchased mining and earth-hauling equipment specifically designed for underground use—an electric cable-powered loader and a diesel-electric shuttle car equipped with a water scrubber. With the dieseler exhaust, the above ground Lodover was easily converted for underground use, and with the electric loader, took care of the loading equipment needs. To augment the diesel-electric shuttle car, which would not handle the increased loading capacity, the Dodge dump trucks were equipped with catalytic exhaust units, so they could be operated inside the mine.

The only change necessary in the automotive trucks is the use of white gas instead of leaded fuel, which is necessary because the leaded fuel has a tendency to poison the catalyst in the muffler.

Fig. 1. Arrows point to the return run of the flight conveyor in system No. 2

Fig. 2. System No. 3 conveyor (arrow) carries chips on final run to storage

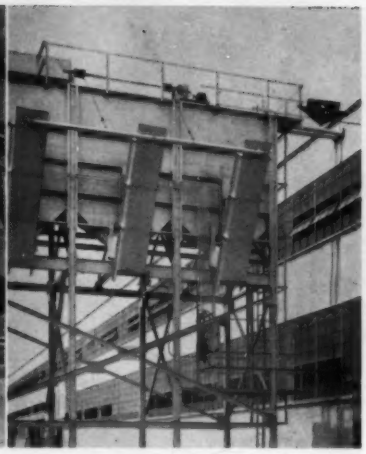


Fig. 3. Chip storage bin has three car-loading chutes. Note conveyor (arrow)

Chips Fall, Dust Flies But Area Stays Clean

Dust, the bugaboo of cast iron machining, is no problem in this case . . . System cleans and returns plant air . . . Chips travel under floor and overhead to outside bin

By J. A. SCATTOLONI, Supervisor, Manufacturing Engineering
Westinghouse Electric Corporation, Columbus, Ohio

Fig. 4. Two large fan units are located on platform at end of machining area

Fig. 5. Arrow points to the ductwork of one of two area dust collecting systems

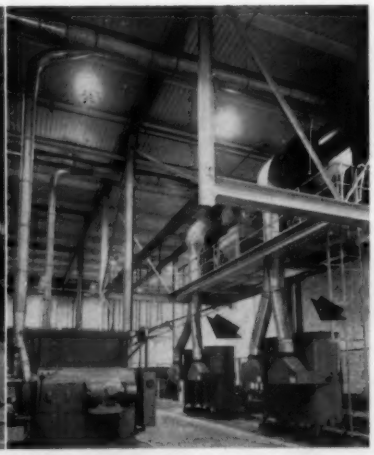


Fig. 6. Each fan exhausts precleaned air through two oil bath after-cleaners

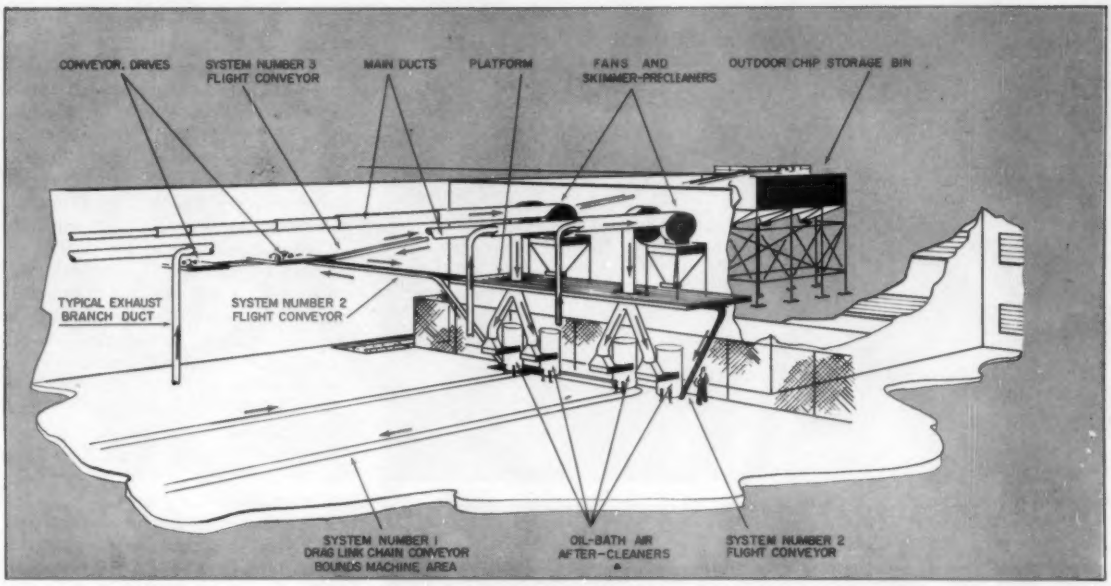

CONVEYOR DRIVES
SYSTEM NUMBER 3 FLIGHT CONVEYOR
MAIN DUCTS
PLATFORM
FANS AND SKIMMER-PRECLEANERS
OUTDOOR CHIP STORAGE BIN
TYPICAL EXHAUST BRANCH DUCT
SYSTEM NUMBER 2 FLIGHT CONVEYOR
SYSTEM NUMBER 1 DRAG LINK CHAIN CONVEYOR BOUNDS MACHINE AREA
OIL-BATH AIR AFTER-CLEANERS
SYSTEM NUMBER 2 FLIGHT CONVEYOR

Fig. 7. Sketch presents general idea of conveyor and ductwork arrangement in plant's chip and dust handling systems

DURING THE development of our Columbus, Ohio, plant layout, consideration was given to cast iron machining and the following objectives were analyzed, evaluated and incorporated: protection of machine operators against breathing cast iron dust-laden air, protection of equipment from abrasive action of the dust and economy in the disposal of chips.

At the present time we have a total of 24 machines assigned to work on cast iron pieces. This equipment is set in two rows, with a system of roller conveyors running between them for movement of parts, Fig. 5. On the other side of each line of machines there is a 10 ft aisle.

The chip handling set-up is designed to convey 30,000 lb of dry cast iron chips per 16-hour-day, from the machining area to an outdoor chip bin. Basically it is made up of three separate systems; System No. 1 supplied by Prab Conveyor, Inc., consists of a drag type chain conveyor approximately 444 ft long and working in a trough mounted under the floor and forming a loop around the two lines of machines. The chips are discharged directly into this conveyor either by gravity or by other auxiliary mechanical means, which receive the chips at the bed of the machines and elevate them into a chute feeding the conveyor.

System No. 1 discharges into System No. 2 which includes approximately 160 ft of sealed-pin Hapman conveyor having neoprene flights. This conveyor receives the chips below the floor level, and elevates the material about 19 ft, Fig. 1 (Arrow).

The 452 ft long Hapman conveyor in System No. 3 receives the chips as they are discharged from System No. 2, Fig. 2 (arrow). Then it climbs to an approximate elevation of 30 ft in its travels to the outside storage bin. From this point, it returns to pick up more material, completing a cycle.

The outside storage bin is installed adjacent to a railroad track, and is so designed as to spout the material directly from the bin to the railroad car, Fig. 3. The bin is approximately 30 ft high, 12 ft wide and 25 ft long with a capacity of approximately 1800 cu ft, sufficient to load one gondola car. It is of weather-tight design, complete with access panels, ladders, and a level indicator.

An alternate method of disposing chips would be to shovel them by hand from the machines into containers and haul them to an outside storage area. The containers would then be loaded by mechanical means into gondola cars. This type of handling would, however, consume valuable man-hours and involve considerable trucking expenditure.

If such a method of chip disposal were to be used by us, the direct labor would run about $1.77 per ton of chips removed and loaded in a railroad car. With our present system handling a normal load of 50 tons per week, the savings are estimated at $4,602 per year. However, there are other advantages to such an installation.

Better housekeeping is realized because spillage is eliminated and clean-up costs are reduced.

Inasmuch as the installation is about a year old, it might be too early to pass judgment on the problem of maintenance. However, after watching this operation over a period of months, we feel very optimistic that with the exception of replacing the neoprene flights every few years, very little maintenance will be required.

In case of a breakdown, chips can be accumulated at the bed of the various machines for considerable time or could be removed by hand and fed into the system later.

Systems Work Together

The cast iron dust collector system has been engineered to work in conjunction with the chip disposing system. This ventilation system consists of two individual units, each serving one line of machines, Fig. 4. Each unit is designed to handle approximately 11,000 cfm with a carrying velocity in the pipes of approximately 4,000 fpm. The main suction lines vary in size from 10 in. up to 20 in. in diameter.

The general layout located the two units at the south end of the machining area. Each of these exhausts air from operations on two separate groups of machines, Fig. 7. The installation of the skimmer-hopper-fan-motor is overhead on a platform directly above the chip conveyor System No. 2. Overhead installation of this equipment is a floor space saving feature.

The Skimmer-precleaner is a low pressure drop centrifugal separator. It is used commonly in applications in which the exhaust air contains chips, shavings or other material of large particle size, or where large concen-

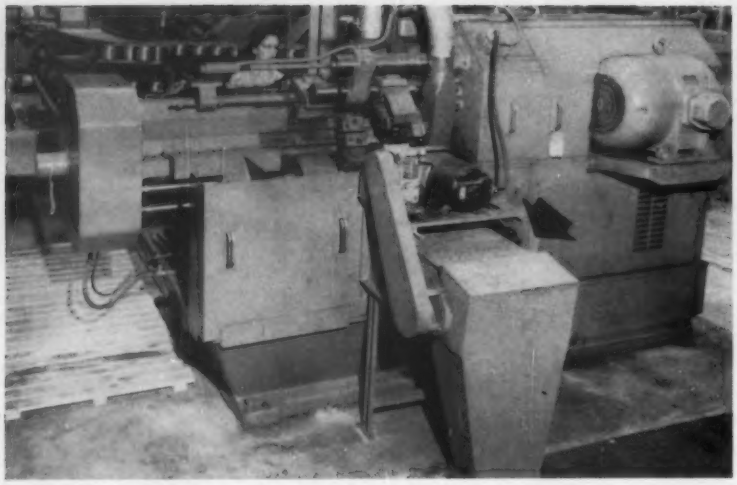


Fig. 8. Belt conveyor (arrow) is one way of moving chips to the sub-floor system

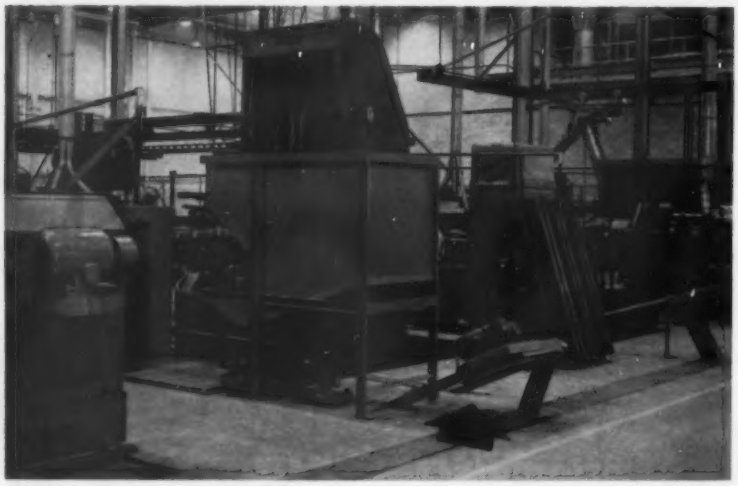


Fig. 9. Chips from broach are disposed by small Hapman conveyor (arrows)

Fig. 10. Gravity chute is used on this machine to channel chips to main conveyor

trations of abrasive dust must be collected.

Dust-laden air enters the precleaner tangentially. The heavier dust particles are forced to follow the involute curve of the wrapper sheet to a wider slot in the bottom, and are skimmed off, and passed into the hopper above arrow in Fig. 4. The Skimmer-precleaner reduces by approximately 75 per cent by weight, the dust to be handled by the Cycoil. Normally no chips are stored in the Skimmer-hopper; however, the hopper has a storage capacity of some 32 cu ft which could be utilized temporarily in case of failure or interruption of operation of the chip disposal system. These particles are discharged from the hopper by means of a rotary lock, into System No. 2, Fig. 4 (arrow).

The exhausted air from the Skimmer-precleaner is then passed through four Cycoils oil bath after-cleaners (2 on each unit) where the remaining small percentage of fine dust is removed and the filtered air permitted to return to the work room. The Cycoils are lined up at the floor level for observation and servicing, Fig. 6.

Air cleaning is accomplished by impingement, centrifugation, scrubbing action and filtration. Dust-laden air is pushed through an oil bath. Vanes impart a whirling action to the air-oil mixture. Then it travels through oil coated layers of densely packed, crimped wire mesh of various sizes. Each Cycoil carries 72 gal. of S.A.E. 50 oil and holds six cu ft of dust accumulated to a six-inch depth.

The overall efficiency of the Skimmer-Cycoil combination is about 99 per cent or more by weight. Cycoil outlet dust counts are considerably below 5 million particles per cu ft. (Not more than 5 million would be anticipated on any cast iron machining application.)

Particle size of material discharged by a Cycoil is less than 5 microns, and the Cycoil is approximately 90 per cent efficient by weight when handling particles 10 microns and lower.

Three main objectives are accomplished with our dust collector system: protection of the operator against breathing cast iron dust, reduction of machine tool maintenance, elimination of heat loss by not exhausting outside.

We are not in a position at this time to accurately evaluate the first two points because of insufficient back experience, although reports from similar installations in other industries have proven to be very gratifying. In eliminating heat loss by cleaning the air before discharging it back into the working room, our figures show that about one ton of coal is saved for every 16-hour day during winter.

Fig. 1. Because this new product combines insulation and hard finish in one unit, installation is reduced to one operation. No coating is required on the face of the blocks for appearance or impact protection; it can be painted, if desirable

It's an Insulation; It's a Ceramic Finish; It's Fireproof; It's Cleanable; It's Hard!

DEVELOPMENT of a unique cellular glass insulating material which combines both insulation and ceramic finish in a single unit, has been announced by Pittsburgh Corning.

Called "Duraface" Foamglas, the new material provides a durable, impact-resisting surface along with high insulating and moisture-proof qualities. Walls for refrigerated storage areas and other rooms where insulation is necessary can be insulated with the material in a single operation since no finish coating is required to protect the insulation. Unsupported walls can be built of the blocks.

The material is completely inorganic. It is rodent-proof, vermin-proof, not affected by fungus, rotproof and fireproof, and resistant to nearly all chemicals. Where sanitation and cleanliness are essential, walls of this substance are easily washed down.

While the white ceramic surface needs no paint or other surface finish for durability and architectural appearance, various types of paint can be applied.

The dual-purpose insulation blocks are manufactured by integrally-fusing the dense face with regular Foamglas. This, according to the manufacturer eliminates any possibility of the surface finish peeling or cracking off. Maintenance costs for an insulated wall of the material will be substantially less.

Impact tests on the dense face of the material show it has about twice the impact resistance of a cement plaster finish. Because each block of the material is an integral unit, impact from pallets, packing cases, hand trucks and similar objects would be confined to the single block involved.

The standard size of blocks is 18 in. by 12 in. The blocks are available in two thicknesses, 3 in. and 4 in. Double courses, using regular Foamglas for the inner course and the new material for the exposed one can be specified.

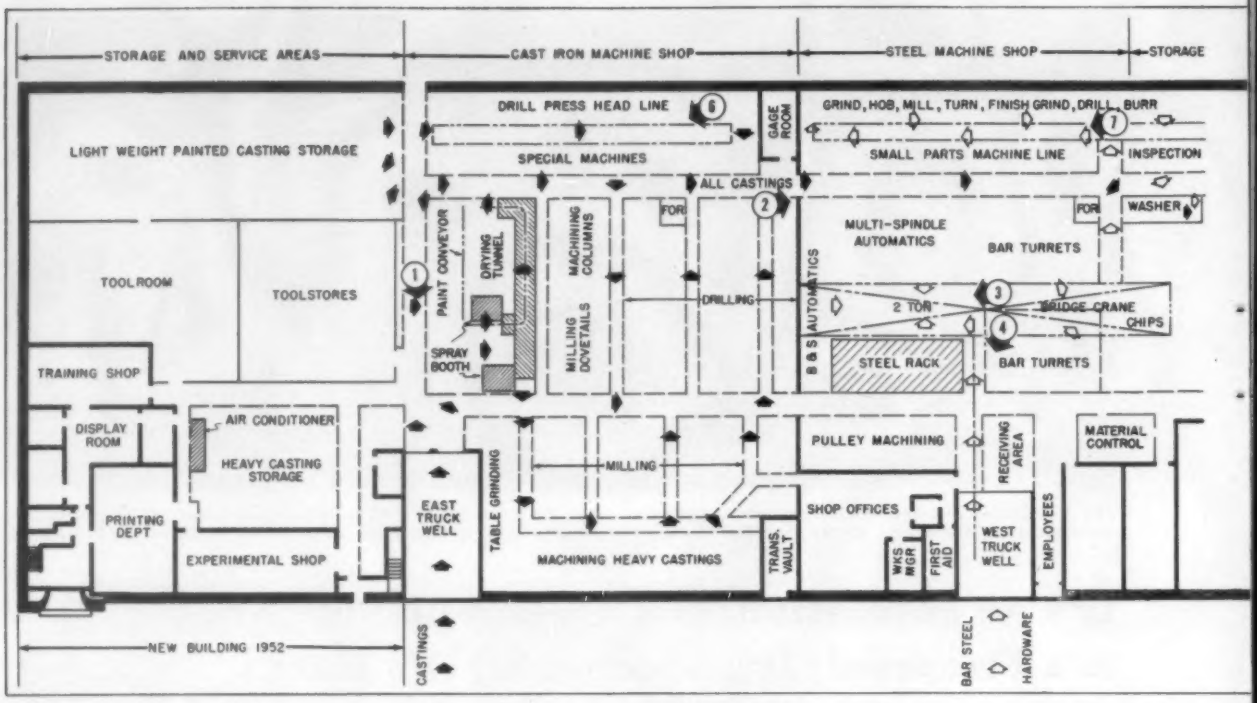
The dual-purpose blocks are easily installed with either straight or staggered joints. Hot asphalt or a cold adhesive may be used. Where necessary, the blocks can be cut and trimmed.

Closed cellular structure of the new material is a natural vapor barrier and absorbs no moisture that would reduce its insulating efficiency. In installations where high humidities and/or low temperatures will exist, the joints between the blocks should be sealed. To facilitate this the face edges of each block are beveled.

Want a Sample?

Samples plus additional information are available on this new product. Just ask for Duraface on your letterhead or use one of the handy postage-paid cards elsewhere in this issue.

Fig. 2. The 18 in. by 12 in. blocks can be used for free-standing walls because of their rigidity and compressive strength; cellular structure is a vapor barrier



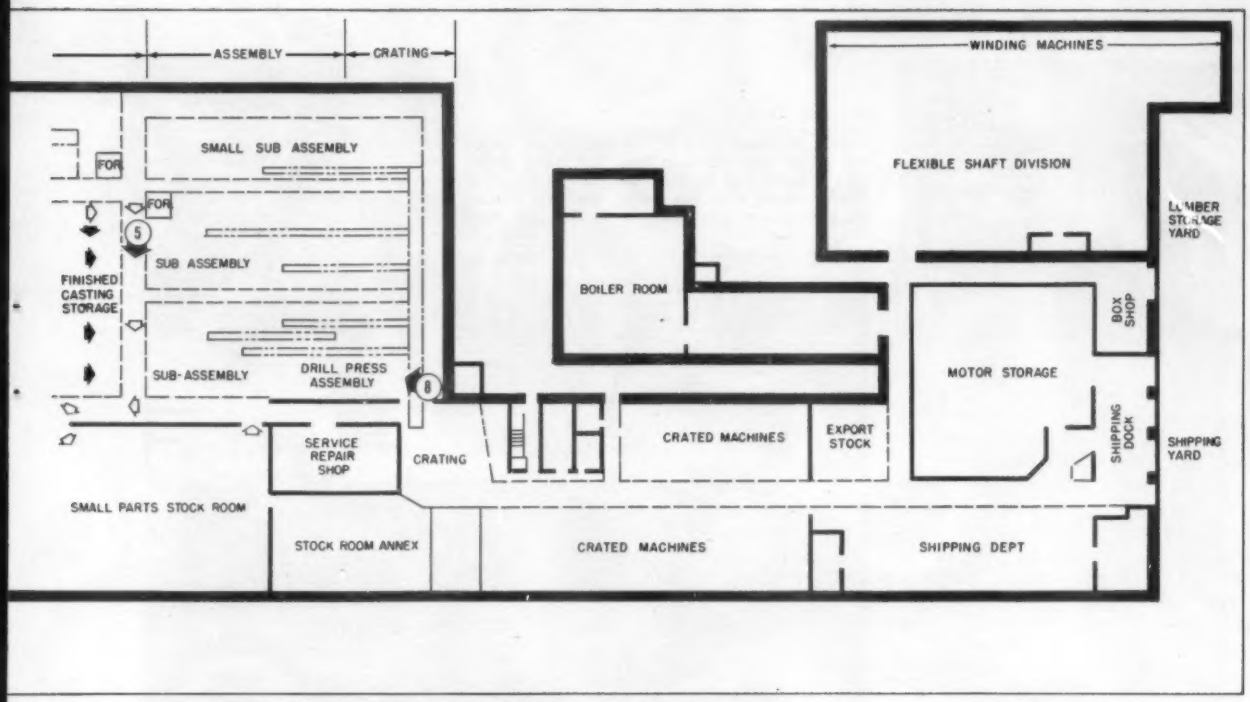
Plan view of the Walker-Turner plant in Plainfield after the modernization job. Solid arrows indicate flow of castings in produc

Modernizing the Small Plant

Modernizing a small plant, with a minimum of down-time and expense is a job that requires intimate knowledge of your plant and process . . . Here's how a small machine tool plant brought its production line up to date, improved traffic conditions, consolidated its operations, all while getting a new model into production

By **STANLEY BURWELL**, Plant Engineer, Walker-Turner Div., Kearney & Trecker Corp.

Fig. 1. Casting receiving area, above, before the modernization. Right: Main aisle in same area after change. Hoist is used in the painting of heavy castings. Aisle goes through to casting storage area located in back of plant



tion. Outline arrows show how bar steel and hardware travel through assembly. Modernization called for a flexible plant

NECESSITY FOR consolidating offices and plant, an acute storage problem, and a new model to tool up, created the setting for a complete plant improvement program at the Walker-Turner Division started in 1952.

Turning out more than twenty types of light machine tools in over 100 sizes and models in a plant that had, like Topsy, grown to occupy all of a former warehouse, a silk mill, and two sizable annexes, as well as an office building several blocks away, had become a merry-go-round of moving and removing boxes of castings, bar steel and partially completed work.

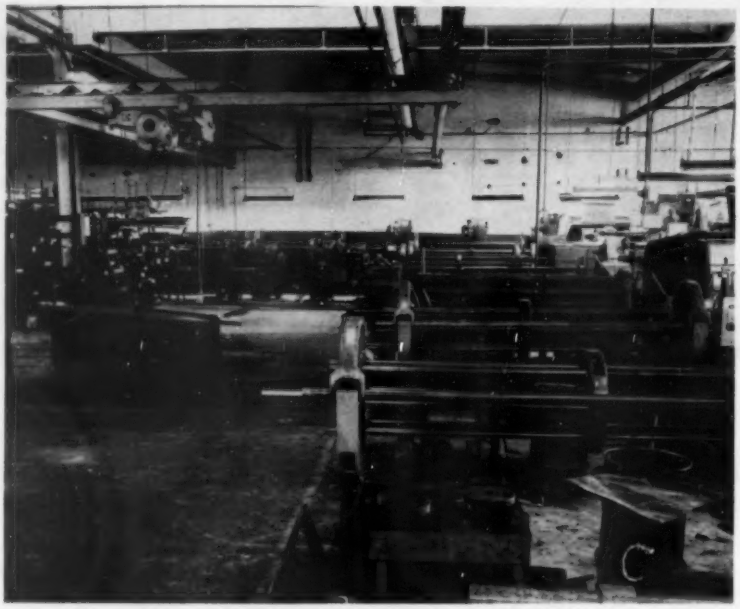
In spite of a very tight space problem and a need to avoid any loss in production, every piece of manufacturing equipment in this plant of over 125,000 sq ft was moved and re-installed by a maintenance crew of 18 men in a period of approximately 5 months. Complete planning in advance of starting any work was a most important factor and occupied the time of two engineers for nearly 5 months.

A long and narrow building with two existing truck wells for receiving shipments was the inflexible situation into which a new and streamlined production lay-out had to be fitted. Less trucking, shorter hauls, more direct flow and the elimination of previous trucking "bottlenecks" were all accomplished by setting up the line of flow shown in the diagram.

Since the two major materials processed are bar steel and iron castings, and only occasionally are both run on any one machine, a re-grouping of machine tools into a Cast Iron Machine Shop and a Steel Machine Shop was a logical move. This has proved

Fig. 2. Above is a view of the one and only main aisle before modernization. Right is one the plant's two 7-ft main aisles following plant remodeling. This aisle runs full length of the plant. Machining operations are on the left

Fig. 3. Another view of the main aisle before modernizations. Below: Site of the old main aisle; this is now the 2-ton crane area. Multi-spindle automatics are on the right and Browne and Sharpe single spindle automatics in the background. Trolley duct was not being used so Walker-Turner maintenance men fitted it to new crane for new hoist. Saving: more than $2,000 over packaged deal



a very satisfactory arrangement for materials handling and supervision.

Whereas castings had sometimes, in the past, been stored for months before machining, we now proposed to eliminate both the serious problem of removing rust and the labor of paint masking by simply re-locating the Paint Department. This department is now right at the truck dock where castings are received directly from shot cleaning at the foundry.

One of the three 10 ft spray booths, which occupied the large room formerly used as a Paint Department, was discarded and the other two moved to the new location at the East Truck Well. This truck well is now used only for incoming castings, drums

Fig. 4. Steel storage, left, was too small. All castings left paint room—beyond cinder block wall—through a small door and this caused extreme congestion. The old paint room is now the shop office. Following modernization, below, bar steel is received through right-hand door from west truck well on a monorail which carries it into the interlocking bridge crane. Chip barrels are moved, too

of paint, and various other supplies.

Investigation showed that 60 per cent of our casting weight was composed of pieces of less than 90 lb, so a cable conveyor was installed to serve one of the paint booths and to traverse a non-heated drying tunnel to handle these small castings. The heavy castings are painted at the other spray booth and are machined progressively along the front of the Cast Iron Machine Shop. Storage of light and heavy castings is adjacent to their respective machining areas.

Another major step in our program was the setting up of a conveyorized straight machine line for the two sizes of drill press heads. These we make in considerable volume. Here, special tooling was used on two standard

Fig. 5. Left: Another view of the main cross aisle near the finished casting storage area as it appeared before modernization. Below: This photo taken looking in direction opposite from that of "before" photo. Finished casting storage area is on the right and the assembly department on the left. Better housekeeping, now practiced at the Walker-Turner plant, is apparent in this photo

Ex-Cell-O boring machines to convert them to single purpose units, one for each size of head.

Following the Ex-Cello-O's are a horizontal mill and 10 special single purpose machines, 9 of which were designed and built in the Walker-Turner tool room. These machines were built from standard Walker-Turner machine tool parts and fitted with adjustable type multi-spindle drill heads. All feeds are powered and automatic so an operator is able to operate more than one machine at the same time.

Three light duty roller conveyors, using plywood pallets, provide sufficient in-process storage to take care of irregularities. A casting started on this line can be taken off at the other end 95 ft away in 20 minutes.

Movement of material in the balance of this machine shop is by hand lift truck using pallets and boxes moving in an orderly flow.

In the corner of the Steel Machine Shop is a small department in which all of the pulleys are machined. These pulleys are principally aluminum sand castings, multi-step "V" belt variety.

Here, a No. 1AC W. & S. chucking type automatic, one of the most profitable of the many new machine tools installed, completely finishes a 5-step "V" belt pulley in 3.5 minutes as against a former 12 to 14 minutes using two turning operations and one hole broaching operation. Tooling was done by our staff.

Next to the Pulley Department are the Shop Offices located centrally in the plant, close to the employees' entrance, yet protected from plant noises by the stout masonry walls of the former paint room. A bright, modern First Aid room, a small interview room, an office for the Works Manager are the divisions in this large office.

Receiving and handling of bar steel was formerly a chore of the first magnitude. Using a power lift truck the bundles were dragged onto the dock and many perspiring helpers carried and loaded the bars piecemeal into the steel track. Now, we use a two-ton Yale hoist which travels on a monorail out into the West Truck Well, picks up the bundles of steel, and, after crossing to an interlocking 20-ft bridge crane, quickly deposits a load of bar-stock where it can be opened and later stored in the re-located rack.

The other two functions of this manually propelled crane are the load-

Fig. 6. Line of special machines—most of them built from drill press parts—produces 15 in. and 20 in. drill press heads. Approximately 600 ft of roller conveyor was installed in this area to carry parts through machining operations

ing of bars into the heavy multi-spindle automatics which are lined up opposite the steel rack in the Steel Machine Shop, and the handling of drums of chips. The chips are taken from the automatics to the oil extractor and chip storage area, located under the other end of the crane run-way, and thence via the monorail into a waiting truck in the West Truck Well.

All miscellaneous goods and materials are received in the other half of this West Truck Well under the control of the adjacent receiving office and are stored in the "Small Finished Parts Stores."

Flow through the Steel Machine Shop involves a minimum of manual handling. Parts coming from all of the automatics and bar turrets are collected from their "tail" ends (under the crane) and brought in tote pans to an "in-process storage area" right by the foreman's office. From here the pans are moved across the main aisle and into the small parts machine line for the remaining operations.

Still in their tote pans the parts are pushed from operation to operation in a "U" shaped path on a heavy roller conveyor. The flow is down one side of the line, then back on the other side to the inspection area, which is also served by a series of intersecting roller conveyors.

After inspection, the steel parts are taken across the main aisle and together with the finished castings from the Cast Iron Machine Shop are fed into a new Detrex conveyor type hot spray automatic washing machine. Castings are then put in boxes and stacked in an adjacent area which was arranged to be at the head end of the assembly lines. Steel parts are returned to tote pans after washing and trucked across the head of the Assembly Department to storage in the Small Parts Stock Room.

The Assembly Department, which employs bench height roller conveyors for sub-assembly, and in some instances for final assembly, has six parallel assembly lines. One or more electric hoists, on a monorail over each of these six assembly lines, is used to assemble heavy components and to make the transfer from bench height conveyor to floor conveyor wherever it may occur.

Conveyor pallets are used for light machines, but the heavier machines are built on a base which later becomes part of the wire-bound crate in which each is packed.

The last portion of each assembly line is used for final inspection and brush touch-up painting of visible portions of castings. Cartoning of small machines is done on the final conveyor, but crating is done on the floor after removal from the conveyor. From here to the shipping dock the transport is by lift truck.

In laying out this plant for better materials flow and better housekeeping, a main aisle width of 7 ft was used and has been found nicely adequate for the four power lift trucks and many hand trucks using them. The former single aisle down the center of this 150-ft wide building was considered inadequate and has been replaced by two main aisles running the entire length of the manufacturing area. The transverse service aisles are 4 ft wide. Repainting of traffic lines, formerly ignored, is now a regular maintenance job.

With the pending addition of a 27,000 ft office and warehouse building, something had to be done about adequate electrical service. A small, unventilated transformer vault had served the original warehouse, now being used for manufacturing. Besides being at some distance from the production areas, the transformers had been increased in size until they filled the vault and were still 50 per cent overloaded. The solution, after much consideration, was to abandon this vault and build a new one.

A location was selected at the front of the plant, for access, and near the center of load. This new vault has five times the area, three times the electrical capacity of the old one. A very high ceiling and a grille front provide ample light and ventilation. Electrical work, which was contracted, provides for primary and secondary circuit breakers and a new secondary panel connected to the existing bus duct in use throughout the plant. Subsequently dry-type capacitors were added to each main bus duct to correct a very low power factor.

Moving of equipment and departments created surprisingly little disturbance to the operation of the plant. Because of the very tight space situation, no move could be made until ground floor space was available in the new building at the East end of the plant. Toolroom equipment was moved by a rigging contractor from one extreme end of the plant to the other and was in operation again the same day. Tool Stores were moved in 1½ days, after new fence enclosures and shelvings had been prepared. They continued to operate while moving.

Seven large automatics were moved and operating again in a single day. The rest of the various machine tools were moved over a period of three weeks by taking each one as it finished a run and required a new setup.

The Small Parts Stores presented the biggest problem with several hundred feet of 7-ft high steel shelving loaded with over 15,000 different parts. This move was scheduled to coincide with a two week vacation period. The annual inventory was taken at the same time. This required a rather large staff during the shut-down period but was

(Continued on page 196)

Fig. 7. This is a view of the secondary steel machining operations. Operator stations are located close together and this has been found to reduce frequency of operator absences

Fig. 8. This is the assembly department for drills and drill presses. Both floor and bench type assembly conveyors are used in this area. Crate bases are shown under machines

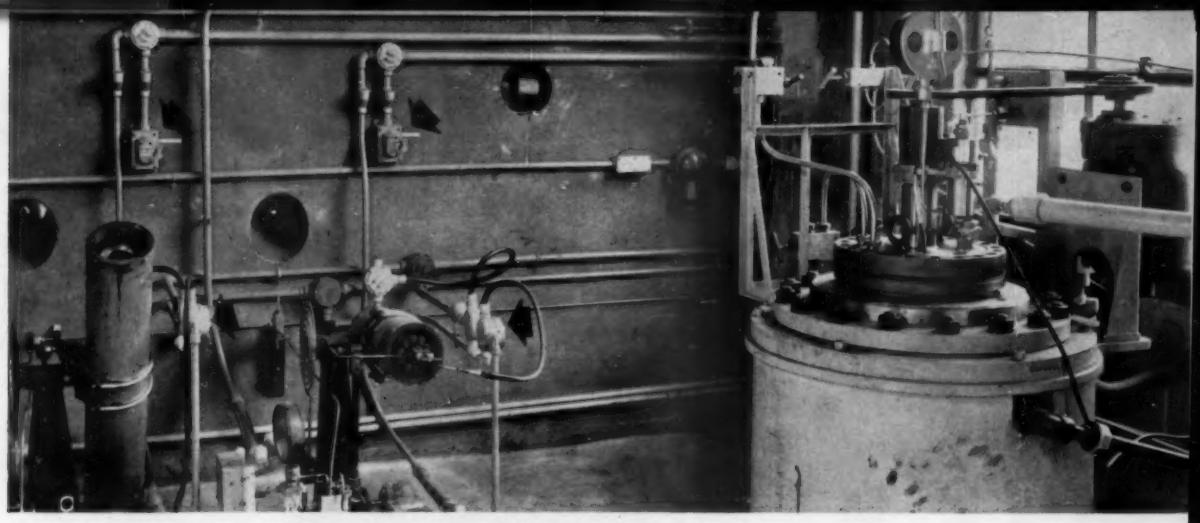


Fig. 1. Arrows point to explosion-proof receptacles and switch enclosures in super pressure autoclave operations room

Explosion-Proof Equipment—

Engineering Protects Research By Special Design

MUCH OF THE RESEARCH that goes into the development of drugs to cure the ailments of mankind would not be possible except for the facilities that were designed by engineers. The research laboratories of the Wm. S. Merrell Company in Cincinnati provide examples of such facilities.

The search for new and better products involves processes that call for certain precautions to protect life and property. For example, flammable vapors resulting from certain reactions are, of course, dangerous and could be set off by a discharge of static electricity. Therefore, the concrete floor has been made to conduct electricity and eliminate sparking. For the same reason, electric equipment and controls have explosion-proof design features. Lights, telephones, water fountains, are all shielded to prevent electrical ignition of any explosive mixture present.

Two fan units equipped for heating are located between the two laboratory wings. Warm filtered air from these units is blown across the opening of the reactor booths to form seals. This air supply equipment is capable of moving 42 tons of air per hour to sweep away traces of flammable vapors, preventing cross-contamination of chemicals from one booth to another. Automatically operated dampers control the air supply to each booth.

Laboratory equipment includes three autoclaves which were built especially to carry on organic chemical reactions at pressures up to 8000 psi and at temperatures up to 752 F, Fig. 1. These autoclaves are located in the operations room which has a movable wall in addition to an observation partition made of reinforced concrete one foot thick. Six-inch portholes fitted with one-inch thick safety glass permit the operators to observe the units in operation.

When an autoclave is being used, the movable wall is open. The opening then serves as the principal "safety valve" in the event that something goes amiss. Window panes are etched to break easily thus preventing possible injury to passers-by from flying glass. Plant regulations forbid an operator inside the operations room during an experiment.

Should an explosion occur in one of the wings, loosely fastened panels, which form two of the walls of the wing, would be blown away from the solid inter-walls and adjoining areas, permitting the gases to escape. This design protects the lives of workers and prevents destruction of valuable equipment.

Fig. 2. Explosion-proof covers are used on phone equipment, switch and thermostat

Fig. 1. Installation job at The Baker Wood Preserving Co. showing the double-grip spikes being pounded into place for construction of an outdoor roadway between plant buildings

This Is The Wood That Will:

Take Weathering; Take Oil Soaking; Be Stable, Tough and Beautiful

ONE OF THE newest of products, made from one of the oldest of materials, is possessed of properties which may make it an outstanding industrial building material in a few years. Called "Doweloc" this product is described as a built-up, precision-formed, edge grain timber in which the desirable characteristics of wood have been retained and with many of the undesirable qualities eliminated.

The success with which this has been accomplished is illustrated in Figs. 2, 4 and 5. A direct comparison is afforded by Fig. 4. Here, a piece of Doweloc, made of oak, and a piece of solid oak were subjected to a 4-hr water spray. Both samples were then placed under a battery of infrared lamps where air at a temperature of 120 F was circulated over them. This process was repeated. The solid lumber checked after the second drying. Doweloc showed no checking.

Still another test which demonstrated the product's resistance to checking or swelling was the oil soak test in which a sample of hickory Doweloc was immersed in motor oil for 212 hr and was then placed in a heated room for 20 days. It is reported there was no perceptible swelling, cupping, twisting or checking.

Fig. 2. One test which the product underwent to simulate wheel load conditions both across and along the grain

Fig. 3. Here workmen are using bar to fit planks snugly together for barge bottom

Doweloc is made up of various lengths of tongue and grooved, kiln-dried, edge-grain hardwood strips fastened together by means of metal dowels which are spaced on 12 in. centers. The end joints are staggered and the lumber can be made in any length desired from 6 ft to 60 ft and in thicknesses of 1 in., 1½ in. and 2 in. Accuracy of the prescribed width of the lumber, 12 in., is assured by the use of 14 parallel components assembled under pressure.

One of the outstanding features of this product is its dimensional stability; it quickly adapts itself to surrounding conditions and then remains practically stable, it is reported. This dimensional stability is said to be due to the products unique treatment.

Economy in use of Doweloc is afforded by its high strength-thickness ratio. For example, in new construction it can be nailed directly to joists without sub-flooring or paper. The double tongue and groove provides an excellent seal and the ends lay over the joist centers eliminating any need for paper.

This product is used extensively as a resurfacing material to add many years of life to an existing floor structure. Studies on the site are necessary to determine whether it is best to lay the planks directly over the old floor, over the sub-floor or directly to the joists. The reasons for this are the possible differences in deflection rates, predetermined stationary loads, wheel loads and other stress conditions.

When laid over concrete, the product is said to improve the quality of the floor from several standpoints; wearing qualities, resilience, insulating properties, appearance, soundproofing, comfort, freedom from dusting, and moisture control.

Choice of Method

There are a number of methods for applying Doweloc over concrete. On a new floor the use of preservative-treated 3 in. by 4 in. oak sleepers within the concrete is an advantage to the concrete itself and provides an excellent means of applying Doweloc. Some builders prefer to use wood screeds or sleepers anchored to the concrete with mastic. This method is fast, easy and economical. When laying wood over concrete it is always best to provide a moisture barrier.

This product is said to make an excellent load-bearing partition or wall. It can be ordered cut to the exact length desired for ease of installation.

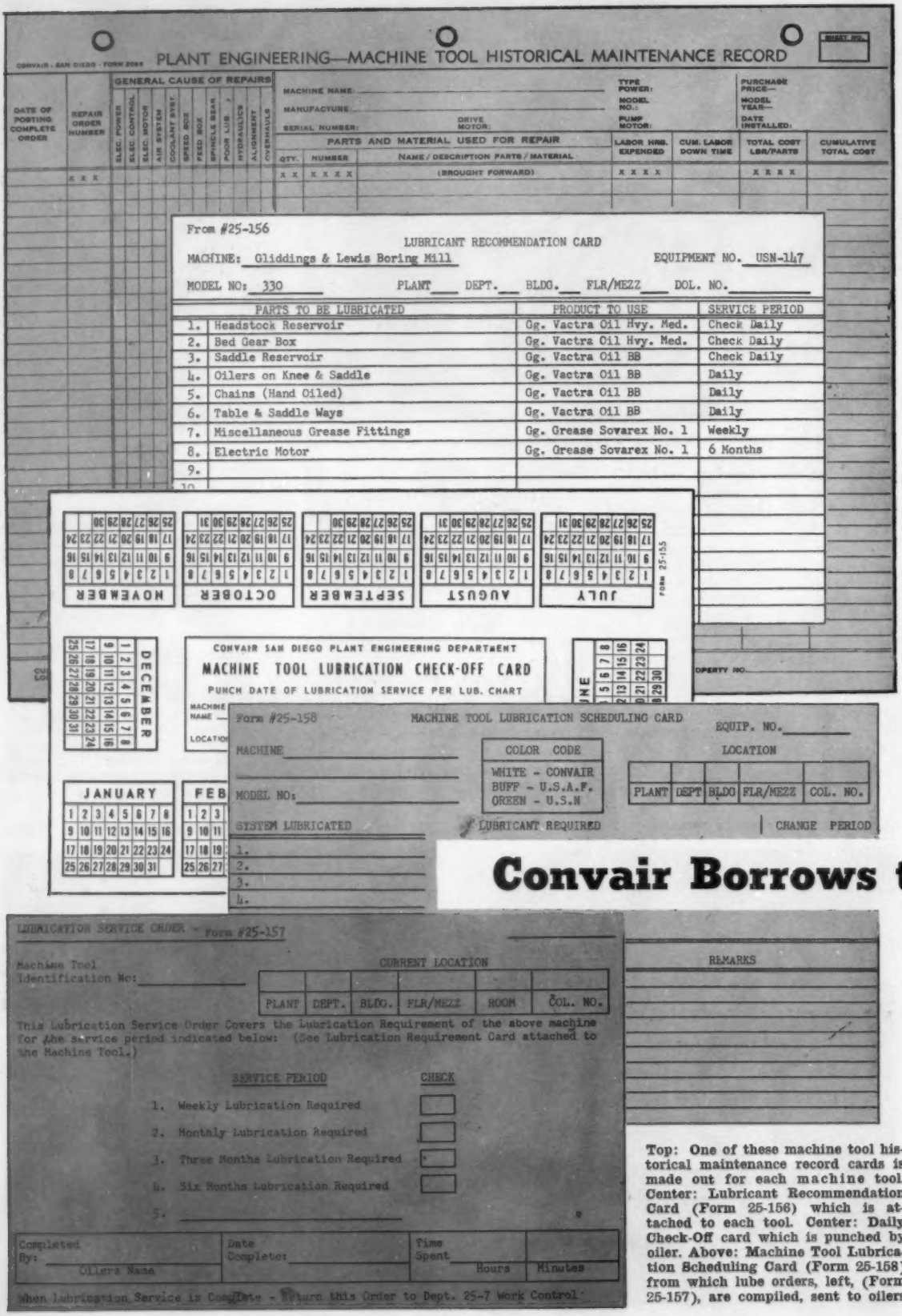
Because of its strength and neat appearance the manufacturer states that Doweloc is finding increasing use as a roof deck. Its load-bearing abilities need fewer purlins, double tongue and groove eliminate sub-purlins.

Want More Information?

If you want more data on this new product just write the Editor, Plant Engineering, 110 S. Dearborn, Chicago 3, Ill. Or write "Doweloc" on one of the postage-paid cards elsewhere in this issue and drop it in the mail.

Fig. 4. Surface checking comparison, Doweloc and solid oak

Fig. 5. Piece of hickory Doweloc after oil soaking, drying



CONVAIR - SAN DIEGO - FORM 2095

PLANT ENGINEERING—MACHINE TOOL HISTORICAL MAINTENANCE RECORD

SHEET NO.

DATE OF POSTING COMPLETE ORDER | REPAIR ORDER NUMBER | GENERAL CAUSE OF REPAIRS: ELEC. POWER, ELEC. CONTROL, ELEC. MOTOR, AIR SYSTEM, COOLANT SYST., SPEED BOX, FEED BOX, SPINDLE BEAR., POOR LUB., HYDRAULICS, ALIGNMENT, OVERHAULS

MACHINE NAME: | TYPE POWER: | PURCHASE PRICE—
MANUFACTURE: | MODEL NO.: | MODEL YEAR—
SERIAL NUMBER: | DRIVE MOTOR: | PUMP MOTOR: | DATE INSTALLED:

PARTS AND MATERIAL USED FOR REPAIR

QTY.	NUMBER	NAME / DESCRIPTION PARTS / MATERIAL	LABOR HRS. EXPENDED	CUM. LABOR DOWN TIME	TOTAL COST LBR/PARTS	CUMULATIVE TOTAL COST
X X	X X X X	(BROUGHT FORWARD)	X X X X		X X X X	

From #25-156

LUBRICANT RECOMMENDATION CARD

MACHINE: Gliddings & Lewis Boring Mill — EQUIPMENT NO. USN-147

MODEL NO: 330 — PLANT ___ DEPT. ___ BLDG. ___ FLR/MEZZ ___ DOL. NO. ___

	PARTS TO BE LUBRICATED	PRODUCT TO USE	SERVICE PERIOD
1.	Headstock Reservoir	Gg. Vactra Oil Hvy. Med.	Check Daily
2.	Bed Gear Box	Gg. Vactra Oil Hvy. Med.	Check Daily
3.	Saddle Reservoir	Gg. Vactra Oil BB	Check Daily
4.	Oilers on Knee & Saddle	Gg. Vactra Oil BB	Daily
5.	Chains (Hand Oiled)	Gg. Vactra Oil BB	Daily
6.	Table & Saddle Ways	Gg. Vactra Oil BB	Daily
7.	Miscellaneous Grease Fittings	Gg. Grease Sovarex No. 1	Weekly
8.	Electric Motor	Gg. Grease Sovarex No. 1	6 Months
9.			
10.			

JULY | AUGUST | SEPTEMBER | OCTOBER | NOVEMBER

FORM 25-155

CONVAIR SAN DIEGO PLANT ENGINEERING DEPARTMENT

MACHINE TOOL LUBRICATION CHECK-OFF CARD

PUNCH DATE OF LUBRICATION SERVICE PER LUB. CHART

MACHINE NAME

LOCATION

DECEMBER | JUNE

JANUARY | FEB

Form #25-158 MACHINE TOOL LUBRICATION SCHEDULING CARD

EQUIP. NO.

MACHINE

MODEL NO:

SYSTEM LUBRICATED

COLOR CODE
WHITE - CONVAIR
BUFF - U.S.A.F.
GREEN - U.S.N

LOCATION

PLANT	DEPT	BLDG	FLR/MEZZ	COL. NO.

LUBRICANT REQUIRED | CHANGE PERIOD

1.
2.
3.
4.

LUBRICATION SERVICE ORDER - Form #25-157

Machine Tool Identification No:

CURRENT LOCATION

PLANT	DEPT.	BLDG.	FLR/MEZZ	ROOM	COL. NO.

This Lubrication Service Order Covers the Lubrication Requirement of the above machine for the service period indicated below: (See Lubrication Requirement Card attached to the Machine Tool.)

SERVICE PERIOD	CHECK
1. Weekly Lubrication Required	
2. Monthly Lubrication Required	
3. Three Months Lubrication Required	
4. Six Months Lubrication Required	
5.	

Completed By: (Oilers Name) | Date Complete: | Time Spent: Hours | Minutes

When Lubrication Service is Complete - Return this Order to Dept. 25-7 Work Control

REMARKS

Convair Borrows the

Top: One of these machine tool historical maintenance record cards is made out for each machine tool. Center: Lubricant Recommendation Card (Form 25-156) which is attached to each tool. Center: Daily Check-Off card which is punched by oiler. Above: Machine Tool Lubrication Scheduling Card (Form 25-158) from which lube orders, left, (Form 25-157), are compiled, sent to oilers

LUBRICANT RECOMMENDATION CHART
MACHINE De Vlieg Jigmil
EQUIPMENT No.
MODEL No. 4 B
SHOP No.
DEPT. No. 115
PARTS TO BE LUBRICATED
PRODUCT TO USE
SERVICE PERIOD
1. Spindle Head Reservoir — Gg. Velocite Oil E — Check Daily
2. Feed Unit Reservoir — Gg. Velocite Oil E — Check Daily
3. Feed Change Gears — Gg. Vactra Oil Hvy. Med. — Check Daily
4. Morse Chains — Gg. Vactra Oil Hvy. Med. — Daily
5. Hand Oiling — Gg. Vactra Oil Hvy. Med. — Daily
6. Way Oilers (Bijur) — Gg. Vactra Oil No. 2 — Daily
7. Grease Packed Parts — Gg. Grease Sovarex No. 1 — 6 Months
8. Electric Motor — Gg. Grease Sovarex No. 1 — 6 Months
NOVEMBER
DECEMBER
JANUARY

Step 1.— **Lubricant Recommendation Chart (Form 25-156) attached to Model 4-B DeVlieg Jigmil. Visible at the extreme right is the daily lubrication check-off card which is punched by oiler upon completion of job**

Railroad Conductor's Punch—
and Streamlines Its Lubrication Procedures

SIXTEEN PER CENT fewer machine breakdowns.

That's Convair-San Diego's reward since adopting an old-fashioned railroad technique to modern machine maintenance.

The technique: use of railroaders' "signature punches" to signify completion of prescribed lubrication.

Works this way: each Convair maintenance oiler is assigned an individualized punch—just like the railroad conductor's. Like the conductor's, each punch cuts a different shaped hole. One punches a diamond-shaped hole; another, an oblong. A third punches a square. No two punch designs are the same.

The punch is the oiler's signature, telling various ass't foremen in charge of lubrication exactly who did the oiling on a specific machine. Oilers "sign"—by punching a "daily lube" check-off card, permanently attached to all Convair machine tools, pumps, fans, cranes and kindred equipment.

Punch Is One Step

Actually, the airframe manufacturer's 16 per cent decrease in machinery breakdown goes much deeper than its adoption of the punch. The punch is only part of Convair's over-all revamping of its lubrication program. Involved are: (1) zonal lubrication beats—with oilers, working three shifts, assigned specific machines; (2) an extensive lubrication survey, conducted by an oil firm, which evaluated every machine's lubrication requirements; (3) a Machine Tool Lubrication Recommendation Card (Form 25-136) fastened to each machine and protected by a plastic envelope; (4) three "Machine Tool Lubrication Check-Off" cards—each a different color denoting shifts. This is the card the zone oiler punches with his "signature" after completing the daily oiling chores specified by the Recommendation Card. Check-off cards, like the recommendation card, are attached to the machine, protected in plastic holders; (5) and finally, a system of

Step 2.— Close-up of daily lube check-off card for Model 4-B DeVlieg Jigmil. Note type of punch used is ordinary railroad conductor's punch. Of all the oilers at Convair, only this man uses this particular punch pattern as he makes the round of machines on his beat

"tickler files" (Form 25-158)—from which lubrication service orders (Form 25-157) are compiled and sent to zone oilers. Work orders alert oilers to weekly, monthly and every six-monthly lubrication needs.

"System," says Convair's Superintendent of Maintenance and Construction, Vern Sharp, "gives oilers a sense of responsibility. It double checks their work. It eliminates the 'guess and bigosh'. Before, we'd hand a guy an oil can and grease gun and tell him to patrol his zone. Now we've analyzed every machine. We work strictly by chart—charts compiled from our recent 6-month survey of every machine in the plant."

But let's draw sharper focus.

Convair's problem was similar to that of any plant fast expanding. Early in 1954, Convair decided to revamp its lubrication program. The company —and its plant maintenance department—started with the basic machine. It invited in lubrication experts from General Petroleum Corp., an affiliate of Socony-Vacuum, from which—currently—Convair buys most of its oils and greases. GP lube engineers spent six months in a machine-to-machine check. Also included in the survey were ventilation blowers, pumps, fans, overhead cranes—as well as Convair's 2700 machine tools.

Step 3.— Clerk prepares Form 25-157, indicating weekly, semi-monthly, three-month and six-month schedules for lubrication. Instructions are entered based on information given in index file at right. When machine is oiled card is returned and entry made in historical file

Lubrication Summary

Each machine's lubrication requirements were summarized on the basis of: (1) the manufacturer's recommendations; (2) the machine's function and use at Convair; (3) recommendations from GP's lube engineers.

From this information, each machine's lubrication cycle was compiled. Some machine parts might need daily, even shift-to-shift attention. Other parts might require lubrication every week, month—or perhaps, as infrequently as every six months.

Specific lubricant needs are compiled on a card—the Lubricant Recommendation Card. Cards are of different colors, denoting whether the machine in question is a Convair-owned tool, or one supplied by the Navy or Air Force. The Recommendation Card—Form No. 25-156—becomes a permanent part of the machine, is fixed to it, in a plastic, grease-proof folder. Under the heading, "Parts to be lubricated," each oil and grease location is listed, along with the type of lubricant to be used and the frequency of service. Thus, for a Gliddings & Lewis Boring Mill, model 330, lube experts recommend that the headstock reservoir be checked daily; that Gg. Vactra Oil Heavy Medium be used. Miscellaneous grease fittings are to get weekly greasing—with Gg. Grease Sovarex No. 1.

Check-Off Cards

Nearby, the Lube Recommendation folder is attached a second plastic envelope. This holds three Machine Tool Lubrication Check-Off Cards—each a different color. Yellow denotes the day shift; green, the swing and white, the graveyard. Each card is imprinted with 12 monthly calendars, altho they're undated. Thus, cards are good for one year. These are "daily" cards. The oiler first checks the Lube Recommendation card. He notes that, say, six parts must be oiled and greased daily. He does the work. Then, with his individualized signature punch, he punches the date space on the proper shift card—literally signing that the work's been completed as recommended.

What of lubrications falling weekly or monthly, or at more infrequent intervals? They're handled by a "reminder file" kept in the plant engineering office at each of Convair's two San Diego factories.

Reminder files hold duplicates of the Lube Recommendation Card. Cards are filed by weeks. Cards come up every week for action. Same applies to work scheduled monthly or for less frequent periods. On Monday, a Lubrication Service Order (Form 25-157) is written up for each machine—as recommended by the duplicate, filed, Recommendation Card. This Service Order is dispatched to the shop, to the assistant foreman in charge of lubrication. He distributes them to his oilers as they begin their zonal beats.

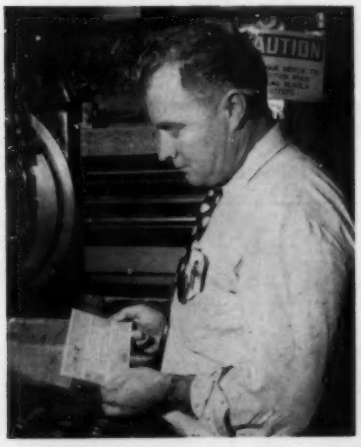
Service Orders

Oilers perform the work ordered. They also check work-order cards against the machine's Lube Recommendation Card. They sign the card, date it and specify the hours and minutes expended on the order. Service Order cards are returned at day's end to the assistant foreman, then forwarded to the lubrication control center. Lubrication data becomes part of each machine's permanent Historical Maintenance Record Card—in the machine's file folder. The signed Service Order is filed in the same folder.

That's how the Convair system works. It works well enough to cut down time (due to faulty lubrication) by 16 per cent.

But the system is further refined. Located at various places in both Convair plants are orderly and well-stocked lubrication depots. Stored here are barrels of oils and greases, each plainly labeled. Oilers operate out of these depots, loading their small, light-weight lube carts with squirt cans, grease guns and other lubrication tools. An average cart holds four oils and two greases.

Maintenance Superintendent Vern Sharp of Convair-San Diego, stops by a Rockford 20-ft open-arm planer to make check of daily lubrication check-off card



Step 4.— After shop has lubricated machine referred to on Form 25-157, in clerk's left hand, it is returned to him for recording in historical maintenance record. At right is stack of forms still to be recorded in the historical records of other machines in the plant

Part of Convair's streamlining has been to reduce lubricant types. At one time, Convair regularly used 33 different types of oils. Now it uses but 8. And three of these are specialized (used primarily, say, for very high speed spindles). Five greases are considered enough by Convair, altho the plant uses another two or three special-purpose types—extremely high or low temperature products.

Zones vary greatly. All depends on the type and number of machines and other equipment scheduled for lubrication in the area. Some congested machine tool areas may employ two oilers to cover a relatively small area. Others, more sparsely machine-tooled, may have one oiler for an entire building. Zones are laid out, gauged for complete lubrication during a 8-hour shift.

Says superintendent Sharp, "Lubrication, as far as I'm concerned, isn't 'preventive maintenance,' It's just plain routine maintenance, the core of any program."

When a machine breaks down, faulty parts are hustled to the plant engineering office for analysis. If poor lubrication is indicated, a check is made of the machine's punched "Check-Off" cards. Responsibility is easily placed. Those "signature" punches tell the story. Also, assistant foremen in charge of lubrication run daily spot checks of Check-Off cards—to make sure the work's being done daily, as recommended. Sharp can't recall a case where an oiler punched the card without first completing the prescribed work.

One reason, he says, is that Convair employs older men as oilers. The work is relatively light, and in this particular field, older men seem to grasp job responsibility more easily than younger employees, he feels. Plant engineering wants an oiler with experience in both lubrication and mechanics. Just a "lube gun" jockey won't do. The company wants oilers to know oil types—and why they're being used. This helps build job responsibility—and pride. And upon job pride rests the whole lubrication system. A guy who lets machined chips splatter into lube cans defeats the program's purpose—and could well ruin a vital machine.

But behind it all is an idea borrowed from the railroads—the "signature" punch. And for Convair, at least, it's been partly responsible for a 16 per cent reduction in machine downtime.

Before

Fig. 1. This is the way the old plant looked when Western Electric took it over from former owners. Glare from windows and dust from celing had to be corrected

High-Level, Low-Brightness Lighting—
How Western Electric Designed It for Precision Work

By L. J. PETERSON, Sr., Electrical Engineer, Western Electric Co., Inc.

USUALLY THE LIGHTING engineer is told to light up a given space after all other services have had their choice of space. Consequently the lighting is chosen to fit the space remaining between sprinklers, air ducts, and other structural features and utilities. The resulting light placed on the work usually lacks much in quality.

Last year the Western Electric Company, Incorporated, took over a building of 40,000 sq ft in Hillside, New Jersey, for the manufacture of submarine cable repeaters.

In the production of this equipment ideal manufacturing conditions must prevail. Temperature and humidity must be rigidly controlled. The air, both make-up and recirculated, must pass through filters to remove all dirt and lint. All surfaces must be of a type that can be washed frequently without being damaged by water.

The repeater parts to be handled here are small, even minute, requiring good lighting under any condition and when precision assembly is added more, much more than good lighting is necessary.

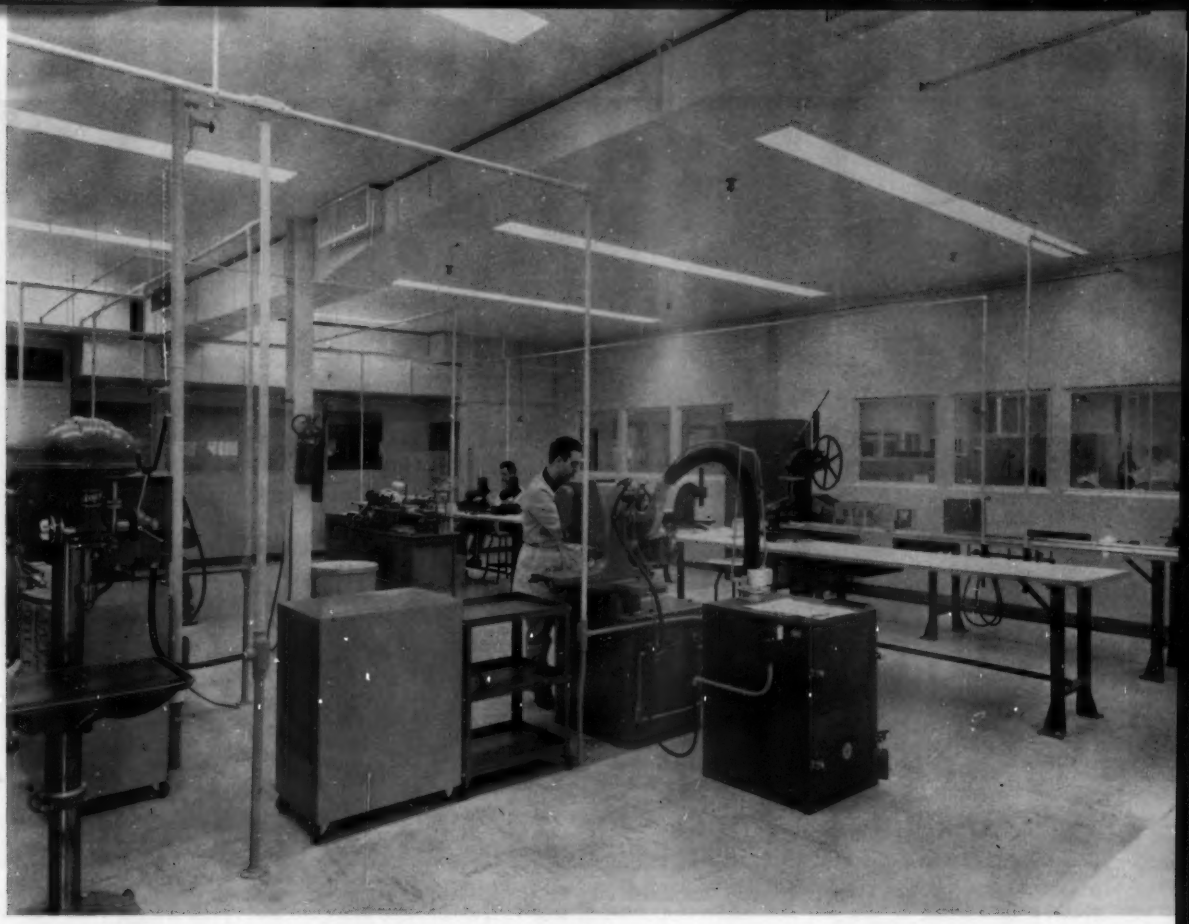
Figure 1 shows a view of the plant as it existed before any remodeling took place. Note the window glare from the ceiling high windows. From the construction of the building it is obvious that a false ceiling is required to seal off dirt from above. Due to the steel structure the false ceiling was established at 11 ft 2 in. height. Suspended lighting fixtures would have been the easiest to install but would have been dust catchers and added to the problem of cleaning and washing the ceiling periodically, therefore, recessed troffers were selected as best fitting the requirements. The Holophane low brightness, plastic lens was selected to close the bottom of the troffer thereby making a smooth ceiling surface for easy cleaning as well as reducing the amount of air leakage through the fixtures.

The low brightness lens provides better brightness control and the plastic provided a safer material to undergo the frequent cleaning.

The lighting, air conditioning and mechanical services were all closely coordinated so that each would be equally effective without compromising any of them. The lighting troffers were run parallel to the main air ducts. However, branch air duct lines had to cross lighting rows, and here the rows were interrupted. This plan

Comparison between the brightness ratios at Hillside and IES recommendations

Brightness Ratios Between	Actual	I.E.S. Recommended Practice	
		Factory	Office
Tasks and Adjacent Surfaces	2:1	5:1	3:1
Tasks and Remote Surfaces	1:1	20:1	10:1
Luminaire and Ceiling	10:1	40:1	20:1
Anywhere Within Normal Field of View	10:1	80:1	40:1
Wall, Ceiling and Floor	1:1	—	—



After

Fig. 2. This is a machine shop area where the lighting level is approximately 60 ft-candles on the benches. Machines are equipped with local lights to give incident light and light in the normally shadowed areas

was designed to give a minimum of 50 foot-candles in the small rooms while the larger areas would have 65 to 75 foot-candles. The recreation room and store rooms were laid out for approximately 25 foot-candles.

The 96 in. Slimline cool white de luxe lamp was chosen as the lighting medium. The color of the de luxe cool white lamp is best suited to bring out the minute color discrimination required in the manufacturing process. It was also chosen as best for employee morale which is important here.

In order to control brightness in the rooms it was necessary that equal consideration be given to all surface finishes. The ceiling was painted white, walls sea foam green and the floor was covered with light grey vinyl tile. Exterior windows were covered on the inside with Transite board except for a vision panel. This furnished the required insulation for air conditioning as well as brightness control on the windows for lighting.

Figure 2 shows a machine shop area where the lighting level is approximately 60 foot-candles on the benches. The machines are equipped with local lights to give incident light and light in shadowed areas. As much as 200 foot-candles is provided at the point of seeing. Note the light finishes on most surfaces.

Figure 3 shows the final assembly and test area where the repeaters take their final shape, are tested and are shipped out for their destination in Davey Jones' Locker. The lighting level in the high bay area is 60 foot-candles while that on the benches, under the lower ceiling, is 70 foot-candles. The high reflectance of the upper walls aids materially in providing almost as much light on the work in the high bay as in the low bay with the same fixture spacing.

A Weston cosine, color corrected foot-candle meter was used to measure all foot-candle levels.

Figure 4 shows the bench assembly area with the brightness and reflectance readings of surfaces indicated thereon. The fixture is the brightest object in the field of view with a reading of only 410 foot-lamberts. The ceiling has a brightness of 40 foot-lamberts, the walls 33 and the floor 31. The bench tops show a brightness of 74 foot-lamberts. Reflectance factors are shown beneath brightness figures.

Lighting engineers have been stressing the importance of upward component for industrial areas to reduce brightness contrast in the ceilings. The writer has specified this type of lighting in all factory areas since this type of fixture has been available and has found the results very satisfactory. In this job the ceiling gets its upward component from the floors, bench tops

Fig. 3. Lighting level in final assembly is 60 foot-candles in high bay area and 70 foot-candles in the low ceiling area

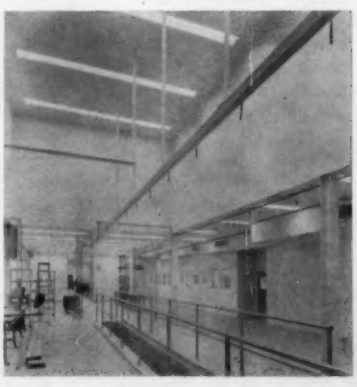


Fig. 4. This is the bench assembly area. Brightness and reflectance readings of surfaces are indicated in lettering. Note that fixture reading is only 410 foot-lamberts and bench tops 74 foot-lamberts. Measured foot-candle level of room was 95

and walls. Indirect lighting is from floor to ceiling rather than the conventional method of ceiling to floor. In this manner brightness control was accomplished and if there is any doubt as to the amount of this control take a look at Table I showing ratios obtained here and those recommended as good practice by the Illuminating Engineering Society.

The ratios obtained here are far better than those recommended and it should be noted that these values were obtained without extra cost. In other words, light colored finishes cost no more than dark colored finishes except in floor tile.

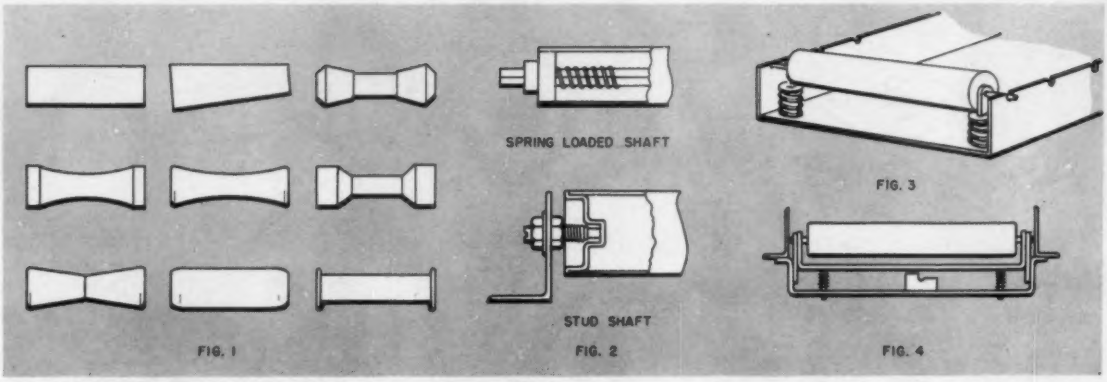
In regard to coverings over the exterior windows, the treatment was much cheaper than the double glazing usually used for insulating windows and much more efficient from the lighting standpoint.

Another factor in favor of high reflecting surfaces can be demonstrated in the calculation of lighting levels. The room shown in Figure 4 rates a room index of C, using the conventional tables of 75 per cent ceiling, 50 per cent walls, 0 per cent floor, the coefficient of utilization of 0.55 giving an initial foot-candle level of 59. Using the inter-reflectance method, the same size room having an 80 per cent ceiling, 50 per cent walls and 30 per cent floor, the coefficient of utilization is 0.69 giving a foot-candle level of 69. The measured foot-candle level in the room of Figure 4 was 95 to 100 foot-candles well after the 100 hour lamp burning period. The expected maintained value is 75 foot-candles.

The fact to be gained here is that higher reflectance surfaces produce a more efficient lighting system. In other words, more foot-candles on working surface per watt burned in the fixture. Another fact that is emphasized here is that lighting fixtures alone do not constitute a good lighting system but all surfaces inside the room have a definite part in making a lighting system.

Figure 5 shows the recreation and lunch area. This picture illustrates the window treatment mentioned heretofore. The treatment extends around the three sides of the shop area approximately 600 lineal feet. The north side is cut off by offices.

Fig. 5. Window treatment is illustrated in photo of recreation and lunch area



Figs. 1 to 4. Various conveyor rollers are illustrated in Fig. 1. The spring loaded shaft and stud shaft are shown in Fig. 2. Spring mounted rollers, Fig. 3, are used where there is a possibility of shock loads. Figure 4, spring-loaded rollers

Consider Wheels and Rollers For a Flexible Conveyor System

Do you need a more versatile conveyor layout? . . . Would a switch here, a roller table there and possibly skate wheels at another point speed up your present setup? . . . If so, here are some of the items you could consider

By S. V. WORTH, Mechanical Engineer

SINCE a skate wheel or roller conveyor is an economical way of handling material, it is used in many conveyor installations. Because it is used so widely, manufacturers of these conveyors have gone to great lengths to extend their utility — by varying skate wheel and roller conveyors and devices so that they fit into more and more material handling projects. As a result, proper knowledge and use of these devices that are on the market today as standard items, can easily save both time and material in setting up a process line — besides making many different conveyor layouts possible and practical.

Some of the many products that are available to users are illustrated and discussed in this article.

So many different types of rollers are obtainable that almost any need can be readily satisfied. Not only are numerous shapes available but sizes anywhere from 1 in. diameter to 5 in. are common with ratings better than 10,000 lb per roll. Rollers, Fig. 1, come in many, many lengths and in all types of material such as steel, wood, rubber or fiber covered materials, aluminum, brass and polished materials. In addition, almost any kind of bearing can be obtained to suit one's needs.

Roller shafts, Fig. 2, are also numerous and varied. They can be obtained round or hexagonal as desired. Stud shafts, manufactured by Logan Co., can be used for any particular reason, for example, to make the roll water tight. In some cases, it may be necessary to add or remove rollers. This can be readily accomplished with the spring-loaded shaft, of the Lamson Corp., by pressing the shaft into or out of its retaining hole in the conveyor frame.

Plastic Covered Rollers

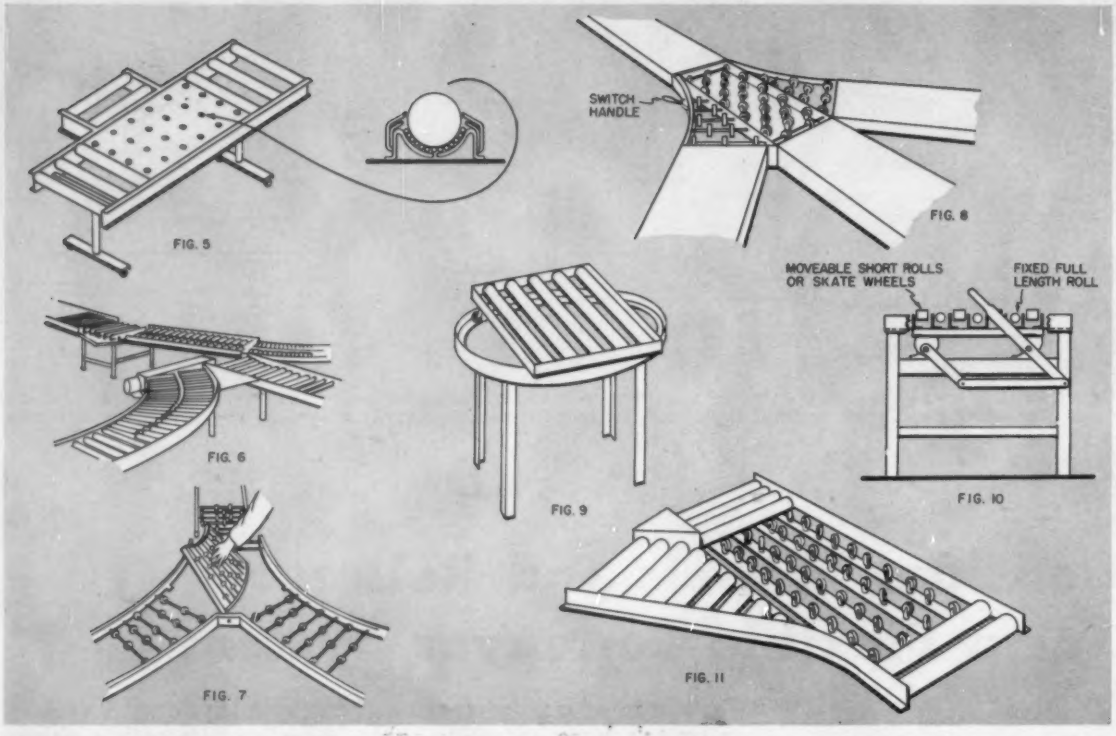
A recent innovation to extend the use of rollers was to cover them with plastic. Actually, a $\frac{1}{32}$ to a $\frac{1}{16}$ in. layer is extruded onto the roller using a semi-rigid vinyl or other plastic. The result is a clean, smooth roller which is impervious to moisture, salts, acids and alkalies, which will not scratch any products and which will avoid product contamination and still present a pleasant appearance.

Where there is a possibility of shock loads or where products being handled have uneven surfaces or protrusions, spring mounted rollers of the Mathews Conveyor Co. could be used, Fig. 3, The springs are precompressed to a rated safe load and yield only as required at the determined load. Capacities of these rollers vary from 900 to 5600 lb each.

Standard spring loaded rollers, H. J. Ferguson Co., can be used as a tie-in in an electrical set up, see Fig. 4. As a carton, for example, contacts the roller, the roller is forced downward thus contacting an electric switch to either open or close a circuit actuating a buzzer, or light or start some other desired task.

A useful adjunct to the gravity conveyor is the ball transfer. Transfer balls, Metzgar Co., can be mounted in a portable gravity section, Fig. 5, so that cartons traveling in one direction, can suddenly be shunted to another direction manually or by means of a fixed shunt. If desired, the balls can be mounted individually on posts fixed to the floor.

Swivel type, "alligator" roller switches, Fig. 6, can be used to feed materials from one conveyor to three or more other conveyors. Because the rollers of the alligator section are all separately mounted, they are always radial—forming a perfect curve at all



Figs. 5 to 11. Conveyor switches: gravity section with transfer balls, Fig. 5; roller switch, Fig. 6; flip switch, Fig. 7; pivoting skate wheel switch, Fig. 8; turntable, Fig. 9; right-angle roller section, Fig. 10; free-swiveling casters, Fig. 11

times without creating a gap at the pivot point. As desired, this switch is made to act manually or mechanically.

Figure 7 shows how switching from one conveyor to two is easily accomplished with a flip-switch of Speedways Conveyors. The central section between the three conveyors is pivoted so that by turning it over, a different material flow route is obtained. The switch is obtainable in 12, 15 and 24 in. standard widths and is made to divert materials to conveyors set at 45 or 90 deg.

Handling Outsize Loads

A somewhat similar device to the flip-switch is the pivoting skate wheel type switch of E. W. Buschman Co., Inc. The center section, Fig. 8, between the feed conveyor and the two discharge conveyors is made up of a plate upon which skate wheels are mounted. When an external lever is thrown, these wheels are caused to rotate and to form a smooth curve from the feed to either of the discharge conveyors.

Turntable devices, Samuel Olson Mfg. Co., are used to feed from one conveyor to any other feasible number of conveyors with the table itself as the central point, Fig. 9. Because it is a rather slow method of switching and because it can be "beefed up" to handle tremendous loads, the turntable is, in general, used for diverting such items as heavy metal castings or loaded pallets.

"Right-angle" discharge device is found in the disappearing roller-type section, Fig. 10. Cartons roll onto the large rollers of this section after which the lines of small rollers, which are at right angles to large ones, are raised, lifting the carton. The carton can then be discharged at right angles to its initial direction. The small rollers can be raised either manually or by an air cylinder actuating either cams or levers.

Free-swiveling casters, Alvey Conveyor Mfg. Co., may be used as an economical converging section. Although the casters, Fig. 11, may offer some interference to the flow of the material as they are lined up by cartons passing over them, still, they do allow passage of cartons from either of two conveyors without any external aligning devices. Precautions should be taken to see that enough slope is given to the caster section and to the sections preceding it to prevent any slowing down and stopping of cartons conveyed.

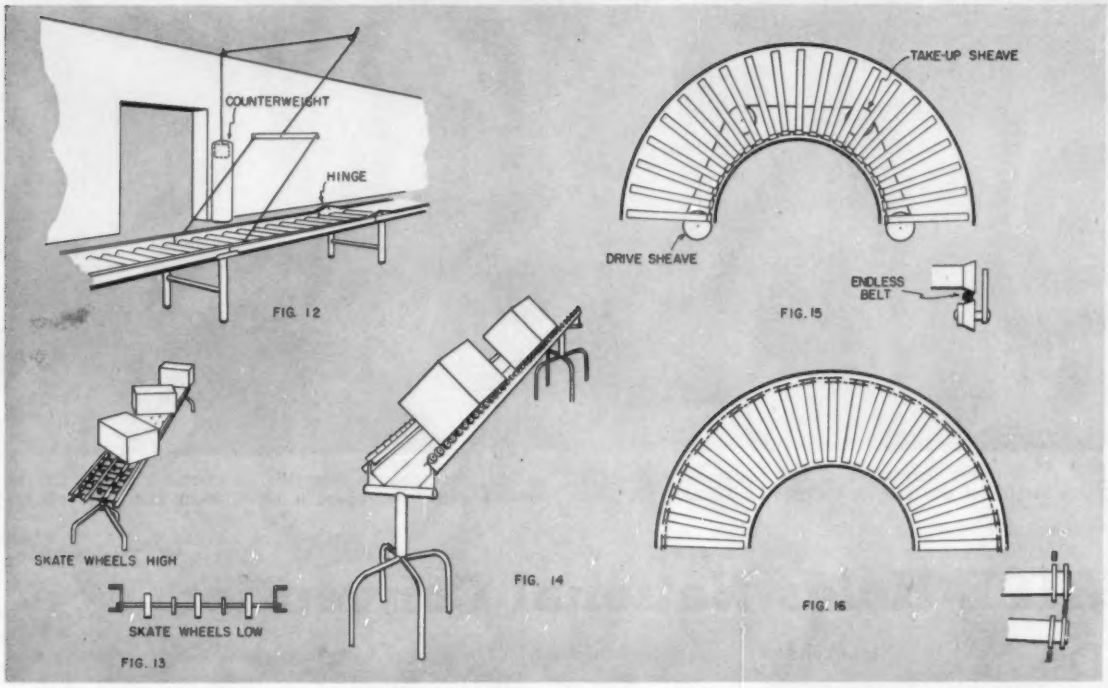
A section in a gravity conveyor can be hinged so that it can be raised, as illustrated in Fig. 12. If desired, this section can also be pivoted off the main conveyor line. In any case, raising this section allows free passage for men or trucks until further material flow along the conveyor is required. This device is manufactured by the Logan Co.

Skate wheels and rollers are sometimes purposely set into their conveyor frames below the center line of the frame. As a result, cartons flowing along these sections are kept in place by the frame itself. Turning the section over 180 deg automatically sets the skate wheels or rollers high so that larger cartons can be handled—even if they overhang the conveyor frames—giving a doubly useful section. See Fig. 13.

Portable Section Handles Cartons

Skate wheels, Fig. 14, may be set on channels, at right angles, to form a very worthwhile conveying section. It has the inherent property of locking in place rectangular or cylindrical cartons flowing on it so that they cannot fall off. Because the cartons are set at an angle, they are also positioned ideally for loading; because they are free all around, one can easily grasp them for removal. In addition, the section is very light and therefore easily portable.

The problem of conveying in an arc, perhaps around a corner, or around an obstruction, has been solved by many manufacturers with a variety of



Figs. 12 to 16. Gravity conveyor can be hinged as in Fig. 12. Skate wheels, Fig. 13 can be set high or low. Skate wheels are set at right angles in Fig. 14. Roller conveyors, Figs. 15 and 16, can be driven by an endless belt or by a chain

live, driven, rollers as in Fig. 15. In this case, the rollers are driven by an endless belt bearing against flanges welded on the rollers. Any degree of arc can be obtained but the drive is not reversible.

An arced roller conveyor can also be chain driven, Fig. 16. Each roller has two sprockets at one end — one sprocket being driven by the adjacent roller on one side and the second sprocket driving the next roller on the other side. A guard rail is placed over the chain as a protective device. Here, the conveyor is reversible.

Another similar conveyor has two gears at one end of the roller — one being a driver while the other is an idler gear. In this case, outside radius of less than 6 ft is obtainable in comparison to a minimum of 6 ft for the chain type conveyor. The arced roller conveyors are supplied by the Standard Conveyor Co.

Variable Speed Handling

Guard rails are used in material handling to guide cartons or divert them. Where a minimum of friction is required, perhaps because of slow moving cartons, channel guards can be used, bent as required, with skate wheels bolted to it as illustrated in Fig. 17. For still smoother operation, two banks of wheels can be used, staggered in relation to each other, to offer a full roller surface.

It is possible to slow down cartons by skewing the conveyor rollers to create a herringbone effect as in Fig. 18. Making the center support rail adjustable, allows one to vary the speed as desired within a certain range. This rail can be moved about 2½ in. If it must remain stationary for any reason, the conveyor speed control unit can have adjustable strips on the outside rails instead.

A useful little item for skate wheel and roller conveyors is the ordinary case stop plate, Fig. 19, which covers a number of rollers, slows the carton down gradually as it enters upon it, and finally stops it with its vertical, upright leg. A similar device, without the vertical leg, is sometimes used to merely slow packages down as they pass over it. Both devices mentioned above are available from the Rapids-Standard Co., Inc.

Figs. 17 to 19. Guard rails equipped with skate wheels, Fig. 17, can be used to guide cartons or divert them. Skewing the conveyor rollers, in Fig. 18, will slow down cartons. Stop plate, Fig. 19, slows down and finally stops a carton

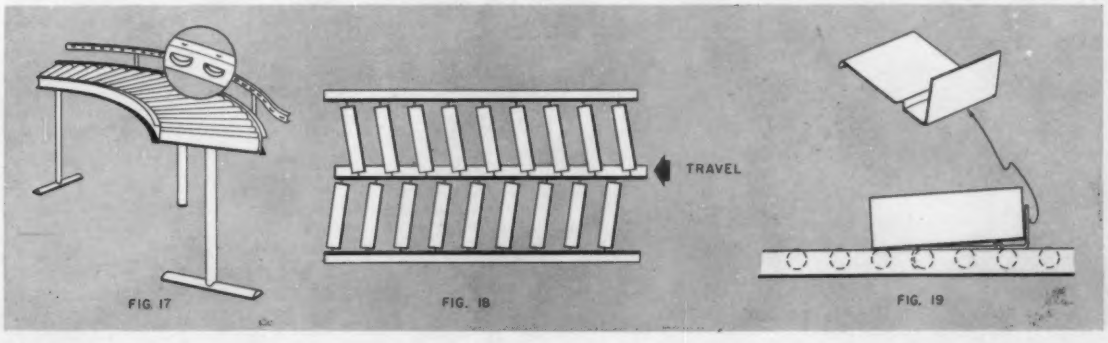


Fig. 1. The first convention of the American Institute of Plant Engineers was held in Chicago on January 23. Delegates and alternates from the 19 charter chapters met to outline objectives, adopt a constitution and elect officers

AIPE Holds National Convention

DELEGATES AND alternates from 19 charter chapters of the American Institute of Plant Engineers met in Chicago, January 23, for their first convention. This new national organization of plant engineers was incorporated in the State of Illinois in June of 1954. Delegates at the first convention represented 558 individual members scattered across the country from New York west to California and from Minnesota south to Texas.

Essentially the convention was an organizational meeting to outline general objectives, set up the organizational framework of the corporation, adopt a constitution and elect officers.

Under the new constitution, the primary governing body is the Board of Directors consisting of one delegate from each chapter. The country is divided into from five to nine districts, each district represented by a regional vice president. The regional vice presidents and the national officers constitute an Executive Committee which will carry on the business affairs of the corporation throughout the year. National officers consist of a president, vice president, secretary and treasurer.

A fundamental concept of the organization is: many close-knit small chapters of limited membership made up of plant engineers of about the same background and degree of responsibility meeting for the discussion of mutual problems; a less formal regional organization for the discussion of local problems; and a national organization to assist in the formation of new chapters and cooperate with other international plant engineering organizations.

Fig. 2. Onlookers consisted of non-voting alternates and representatives of plant engineers clubs who took notes to bring back to their respective club members

In order to foster the formation of new chapters, provision was made for members-at-large. Membership requirements and grades are in agreement with the Uniform Grades of Membership in Engineering Societies recommended by the Engineers Council for Professional Development. These include: member; associate; student; affiliate; and fellow. Dues for members-at-large were set at $3.00 per year until June 30, 1955, $5.00 after that date, but with no initiation fee until the next annual meeting.

As a start toward bringing the industrial opportunities of the profession before educational circles, the delegates at the convention collected and contributed $150 as a nucleus of a new Student Aid Fund. This fund which has already been materially increased by personal contributions and other sources is to be administered to help worthy and needy plant engineering students. The fund was suggested by a similar activity that has been carried on for many years by the Woman's Auxiliary of the ASME.

The convention, which had been adjourned late in the evening of January 23 was continued after the luncheon sponsored by the Chicagoland Clubs at the Stock Yard Inn on January 25. At that time the committees reported on their activities and plans for the coming year.

National officers* elected and committees* appointed include: President, R. H. Morris (San Francisco); Vice

President, R. W. Hiller (Pittsburgh); Secretary, S. A. Simonson (Northern Illinois); and Treasurer, T. S. Ramond (Chicago).

Constitution Committee: R. W. Hiller, Dravo Corp. (Pittsburgh); Paul Bowman, Seeger Refrigerator Co., (Twin Cities); M. O'Hern, American Steel Foundries (Calumet Region); J. M. Weeks, Plomb Tool Co. (Los Angeles); and Jack Starnes, Faultless Caster Co. (Evansville).

Membership Committee: Paul Bobick, Continental Can Co. (Baltimore); H. Travis, Ruppert Brewery Co. (New York); George Breisch, Parke, Davis & Co. (Detroit); and Ed Potter, International Harvester Co. (Milwaukee).

Finance Committee: T. S. Ramond, Goodman Mfg. Co. (Chicago); John Waligora, Sharp & Dohme, Div. of Merck & Co. (Philadelphia); L. T. Schoof, The California Ink Co. (San Francisco) and E. G. Applegate, Bendix Aviation Corp. (Kansas City).

Future Activities Committee: C. C. Bassett, Belknap Hardware & Mfg. Co. (Kentuckiana); S. A. Simonson, Chicago Hardware Co. (Northern Illinois); Don Smith, The Duriron Co., Inc. (Dayton); and W. S. Duncan, Tobin Packing Co., former member of the Toledo Club and acting as representative of members-at-large. For members-at-large, the constitution provides for representation on the Board of Directors of one per 100 members up to a fifth of the total Board.

Fig. 3. National officers of the AIPE are, left to right: S. Simonson, secretary; T. S. Ramond, treasurer; R. W. Hiller, vice president; and R. H. Morris, president

Representatives of other clubs, not voting or absent when the convention was called to order: Jack Coffin, Towle Mfg. Co. (Boston); C. G. Matko, Reichhold Chemical Co. (Northern New Jersey); R. C. Thiede, General Aniline Works (Union-Middlesex Counties); C. L. Turner, Citizens Gas & Coke Utility (Central Indiana); W. E. Seales, F. H. Maloney Co. (Gulf Coast); and J. G. Armstead, F. C. Huyck & Sons (Mohawk-Hudson).

Inasmuch as this convention was primarily a business meeting no program of outside activities was arranged. Following the precedent established at the 1954 Plant Maintenance Conference & Show, however, the three Chicagoland Clubs sponsored the luncheon mentioned above. This was primarily a social occasion arranged to give plant engineers from different parts of the country an opportunity to meet and talk with old and new friends. This year the committee invited Saul Poliak, dean of industrial show enterpreneurs, to speak.

National headquarters for the coming year was established at Room 620, Westminster Building, Chicago 3, Illinois. Membership applications and data regarding the organization can be obtained at the above address or from any of the national or local officers. Membership directories are available only from National Headquarters.

* In the lists of officers and committee members the designation following the names indicate the chapter in which the individual holds a membership card—company connections and other data will be found in the new AIPE Directory of Plant Engineers Organizations which has been sent to all members.

Fig. 4. Plant engineers attending the sixth Plant Maintenance and Engineering Show and Conference took time out on Tuesday to meet and talk with old and new friends at this informal luncheon. Saul Poliak was guest speaker

Fig. 1. After measuring splicing sleeve to center cable ends, it is set in the splicing head, shown in an upright position

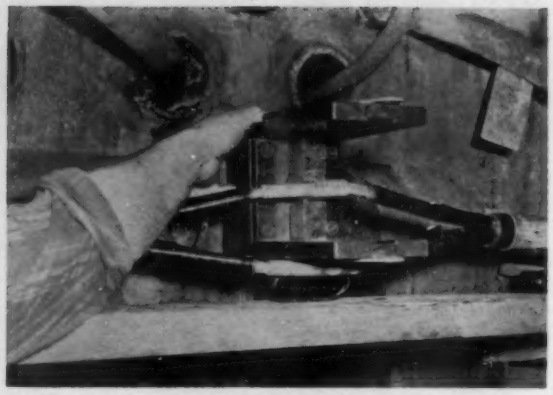


Fig. 2. Splicing head, in horizontal position, illustrates how the splicing sleeve is placed in bottom part of the die

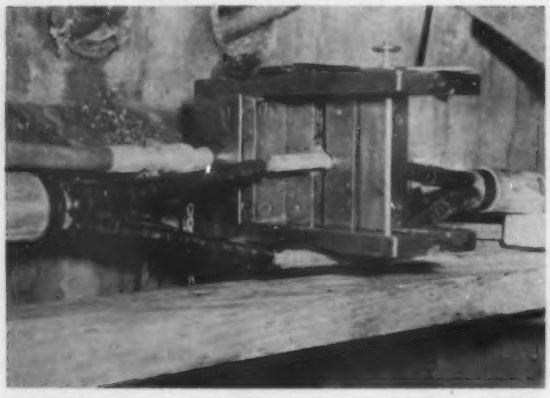


Fig. 3. This view shows the splicing head with the clamp bar and upper die in place just before hydraulic pressure is applied

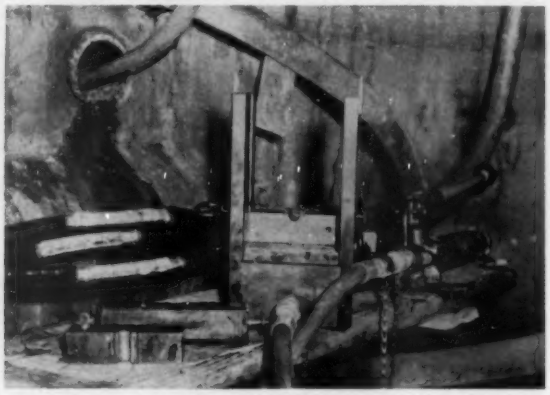


Fig. 4. Completed splices are shown at left. Tool's upper die, clamp bar are in foreground and hydraulic pump at right

Compression Splicing of Aluminum Cable

After treating aluminum cable ends, splicing sleeve is slipped over them and assembly is squeezed together in a special tool to complete the splice

PRODUCTION OF GASOLINE and other petroleum products at Sinclair Refining Company's Marcus Hook, Pa. refinery depends on a 20,000-cfm blower which provides air for circulation and regeneration of cracking catalyst. The blower is driven by a 2000-hp electric motor powered by current conducted by a 3/0 aluminum compact sector cable.

When the underground cable was installed, a decision was made to splice it with aluminum compression sleeves rather than with soldered ones. Key reasons were the superiority of the splice and safety of installation. A reliable splice in this location is important—a failure could cause an extremely expensive shutdown.

Other reasons for choosing compression splicers were the safety and ease with which they can be installed. Since a compression joint is made by mechanical means, no heat or flame is involved. This is important in the underground manholes, where the installations are made, because inflammable and explosive refinery fumes may be present.

The quality of soldered joints depends on many uncontrolled variables —temperature, flux, cleanliness, operator skill, aluminum oxide formation on the cable and insulation damage from the heat. In addition, numerous items of equipment are needed to install a soldered splice. These include, a soldering pot, ladle, flux, solder and source of heat.

In contrast, the hydraulic-powered compression tool is light and portable. It can be used by an unskilled workman and rapidly makes high quality, uniform splices, say engineers at the Thomas & Betts Co., which made the tools and fittings installed at Marcus Hook. The skill is built into the tool's precision frame and dies.

To make a compression cable splice, the workman first coats the aluminum cable ends with an oxide inhibiting compound such as petroleum base inhibitor compound and scrubs it clean. Then, the splicing sleeve is slipped over the cable ends and the assembly is squeezed together by the tool until it is one almost-solid unit. The joint is completed and ready for service.

Characteristics of aluminum cable appear on opposite page.

Characteristics of aluminum cable are shown in this table, as well as how aluminum reacts under various conditions. In addition, chart tells what care should be taken when stripping insulation and what to do when cleaning cable

What You Should Know	Characteristics of Aluminum Cable	What You Should Do
1. Aluminum has lower current-carrying capacity rating than copper.	**Conductivity:** Aluminum does not have the same conductivity as copper. It has a conductivity of 61 per cent of the International Annealed Copper Standard. The National Electrical Code has established the current-carrying capacity of aluminum cable as 84 per cent of the capacity of comparable copper cable.	**1. Consult table of National Electrical Code Ratings for Insulated Aluminum Conductors.**
2. Aluminum is normally covered by a thin, insulating oxide film.	**Oxide Film:** As soon as aluminum is exposed to the air, a film of aluminum oxide forms over it. This film is an insulator. It insulates the individual strands in an aluminum cable from one another and tends to insulate the cable from a connector. Although compression connectors are designed for use without any preparation of normally clean cable, it is good practice to clean the surface of the bared cable. Coat the cable end with a generous layer of oxide inhibitor compound or zinc chromate paste. Petroleum jelly or light machine grease may be used also. Clean the oxide film off the cable strands with fine emery cloth or a wire brush, working right through the compound. The compound seals the freshly cleaned aluminum against air and keeps a new oxide film from forming. Put the compound-tested cable end, compound and all, immediately into the connector. Any surplus compound should be carefully wiped off the cable insulation. If the conductor is a compression-type terminal, the barrel of the connector will be compressed on the cable until the cable strands and the connector are one almost-solid unit.	**2. a. Clean old or dirty cable with wire brush and inhibitor compound.** **b. Use terminals that break the oxide film.** **c. Protect joints against oxidation.**
3. Aluminum is tender, easily damaged.	**Tenderness:** Aluminum is very susceptible to mechanical damage. A small knife cut in a strand will make that strand break if the cable vibrates or bends. Use great care in removing insulation from aluminum cable. Do not circle the insulation with a knife, but pare it off as if you were sharpening a pencil. Because of this tenderness, the connectors used on aluminum should apply pressure equally all around.	**3. a. In stripping insulation, do not nick the cable.** **b. Use aluminum washers with aluminum lugs.**
4. Aluminum expands and contracts 38 per cent more than copper.	**Thermal Expansion:** When aluminum is heated, it expands more for the same temperature change than copper does; and aluminum shrinks more—about 38 per cent more—in the cold than copper does. A copper terminal that is tightened on an aluminum cable at room temperature will be loose when the temperature drops to freezing, because the aluminum cable shrinks more than the copper terminal. It will grow tighter when the cable warms up. If the temperature rises much above the temperature at which the connector was installed, then the rapidly expanding aluminum will be over-compressed. It may even extrude a little. Then as the connector cools, the joint will be looser than ever. Air can reach the contact surfaces, and it allows reforming of the insulating oxide on the aluminum. Copper connectors on aluminum cable make bad electrical connections.	**4. For permanently tight connections, use aluminum cable.**
5. In damp atmosphere, aluminum corrodes when pressed against copper.	**Electrolytic Action:** When two different metals are pressed together and moisture is present, they become a miniature electric cell. One of the metals is eaten away like the zinc plate in a wet battery. In the case of a copper connector on an aluminum cable exposed to salty atmosphere or damp industrial atmosphere, it is the aluminum which is corroded and slowly eaten away.	**5. a. Whenever possible connect aluminum to aluminum.** **b. Tin plate aluminum that touches copper.**

Electrostatic Precipitators—

Headline Parker Pen Plant Facilities

Plant design features pay production and operation dividends . . . Precipitators clean large volumes of recirculated air . . . Sub-floor service lines are easily reached

APPLICATIONS of sound plant engineering ideas have paid off in a big way at the new plant of Parker Pen Company just outside Janesville, Wisconsin.

Arrow Park, which opened in July, 1953, is one of the few completely air-conditioned plants in the nation. Erected on a landscaped plot that includes outdoor lunchroom facilities for Parker employees, the modernistically-styled structure, faced with white Roman brick, also contains one of the largest industrial installations of sound-proofing material in the country. An interesting feature is the layout of the utility system, which can be altered and serviced in a fraction of the time required in older plants.

Forming an integral part of the air-conditioning system are several Westinghouse electronic air cleaners, which cleanse the air that circulates throughout the plant.

The cleansing job is so thorough, that it will remove even smoke, which contains the smallest of contaminated particles.

The Precipitron cleansers, Fig. 1, remove both the impurities generated in work areas and those brought in by outside air. Briefly, here is how the task is accomplished:

Electronic air cleaners use electrical forces to remove air impurities. They charge particles of dirt and then attract these charged particles out of the air stream to collector plates of the opposite polarity. This method of air cleaning is not hampered by the size of the particles and there is no reduction in the air-flow. Over 92 per cent of dirt particles are removed from 100 microns (1/250 in.) down through fumes and smokes to the point where individual particles can no longer be detected (0.1 micron).

The collector plates are coated with a water-soluble adhesive. Each morning, the dirt-filled adhesive is automatically washed off and replaced with a clean supply. The contaminated adhesive flows into a sludge tank, where it settles for seven days. Some of the dirt is actually precious metal, generated in Parker's gold nib department, where pen points are made. At the end of the settling period, an outside firm cleans the tank and separates the precious metal from the residue. Parker uses the reclaimed metal in its manufacturing operations.

After leaving the air cleaners, the air passes through the coils and fans of the air-conditioning system. In winter, heat to the coils is generated by one of two 300 hp oil-burning boilers. In summer, the air is cooled by water from a 94 ft well. A 24-in. pump powered by a 75 hp motor, forces water through the cooling coils at rates up to 1500 gpm. Thermostats regulate the temperature in each department.

The air-conditioning system, built by Westinghouse, is paying its own way, according to Parker officials. Because of the Precipitron electronic air cleaners, more than 75 per cent of the air inside the plant can be used over again. Here's why:

Depending on the season, air at this plant must be cooled or warmed at the rate of 560,000 cfm. Of this amount, more than 420,000 cu ft come from inside the plant. Some 300,000 cu ft

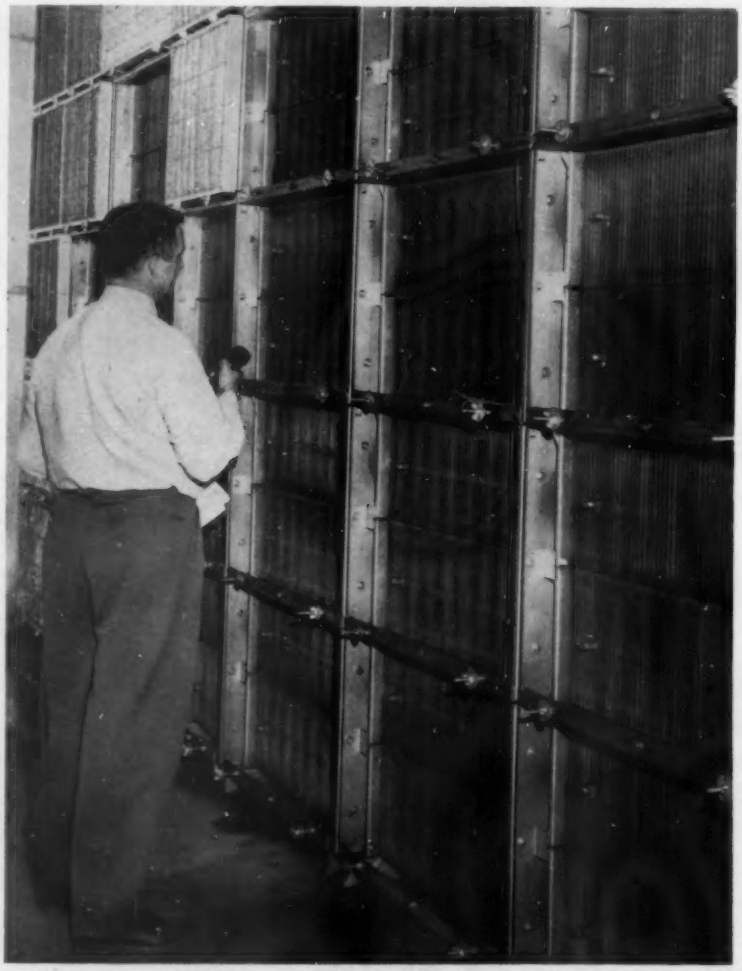


Fig. 1. This is a section of a large curtain of electrically charged plates which attract particles from dirty air. There are two such installations in the plant

of the inside air are laden with dust and fumes from production operations, and would have to be exhausted if it weren't for the cleansing action provided by the precipitators.

Heating this inside air in winter, or cooling it in summer, requires much less oil or water than a similar quantity of air brought in from outside. This fact is reflected in heating costs for the plant, which, with 212,500 sq ft of floor space, has 235 per cent more area than the facility it replaced. Heating costs at Arrow Park between October, 1953, and March, 1954, were only 39 per cent higher than the bill at the old plant for the same six month period the year before the move.

Noise Level Reduced

Air conditioning has also helped production and labor relations. Employees are less irritable, less personal time is taken off on the job, and there are fewer rejects, company officials report. For example, although production at Arrow Park is up 20 to 25 per cent compared to the rate before the move, re-operation costs are only 1.3 per cent higher.

Much of the production improvement is due to the reduction of noise throughout the plant. In one department, for example, where most of the 19 metal and plastic parts used in Parker pens are processed, there are 41 screw machines and eight injection molding machines. The noise level is about 80 decibels, far below the amount in the same department at the former plant, and well under the 90 decibels that is generally considered allowable for such an installation. Sound levels throughout Arrow Park are 40 to 50 per cent under what they were before the move.

Noise is reduced through use of glass fiber ceiling boards, three feet long and three feet wide. There are more than 200,000 sq ft of glass fiber soundproofing throughout the plant.

The boards are installed as a false ceiling. They rest on aluminum 'tee' strips, which run the length and width of each room. The boards are laid on the open squares formed by these tee strips and remain in place without further attachment.

Production at Arrow Park is also speeded by the layout of the plant. Before the move, Parker's manufacturing facilities were located in four buildings. The shipping department was a mile from the final assembly department. Final assembly was on the third floor of a building that had been erected in 1920, which was located a block from Janesville's heavily-congested central business district. Most of the firm's offices were in this building, but space in three additional structures was needed for administrative operations.

Fig. 2. Overhead diffusers supply conditioned air to the maintenance department

Before the move, work processed in one department, located in the basement of the downtown building, would have to be moved out to a loading platform and trucked through the traffic congestion to the sub-assembly department, a quarter of a mile away. After being processed there, pen parts would be returned to the building downtown and were carried up three flights in an elevator to final assembly. From final assembly, the parts went down the elevator and into a truck again for the one-mile ride to the shipping department and warehouse.

Better Working Conditions

At Arrow Park, production flows from one side of the plant to the other just once. There is virtually no backtracking along the way. All production facilities, with the exception of the gold nib department, are on one floor of one building.

Perhaps the best testimony to the efficiency of the new plant's layout is that only one worker, operating a lift truck, is needed to transfer work in process among departments. This worker also handles all warehousing operations. Current production volume at the plant is at a rate of around 10 million finished units a year.

The move to Arrow Park resulted in several other improvements in production facilities. Aisles are now eight feet wide between departments. Formerly, they ranged from "just enough room to squeeze by," as one company official put it, to six feet. Lighting has been improved also. Rapid-start, fluorescent fixtures are installed in continuous lines, 10 ft apart, at the new plant. Recessed into the ceiling, they provide an average of 70 ft-c of illumination on work surfaces. In their former locations, the departments were illuminated by suspended fluorescents, which provided from 35 to 65 ft-c.

Thermopane glass is used throughout the plant. Each pane consists of two quarter-inch thick plates of glass with an air space between them. The inside pane is clear, while the outside pane is tinted.

Music is provided throughout the working day from a record studio inside the plant. The music is broadcast from a loudspeaker public address system. The record room includes equipment for taping speeches and radio programs, microphones for voice announcements, and a turntable for records.

Probably the most novel feature of Arrow Park's design is an "access area" that was built in place of the conventional basement. Utility lines hang exposed from the ceiling of this area which has a four-foot clearance. Maintenance crews are thus permitted easy access to them at all times, and the necessity of extricating lines from concrete walls or ceilings, usual in most plants, has been eliminated.

(Continued on page 196)

With Meter and Analyzer Kearney & Trecker Goes After Noise

Instruments took guesswork out of noise control in this plant . . . Results were plotted on charts . . . Article tells how some noise conditions were tackled and corrected

By W. M. CLARK, Maintenance Manager, Kearney & Trecker Corporation, Milwaukee

FROM THE STUDY of physical principles, we know that sound results from vibrations. These have various degrees of effect on the human ear. Vibrations emanating from musical instruments may blend into something pleasant to hear. On the other hand industrial sounds, more specifically noises, may have adverse effects and warrant serious study in the way of elimination.

We at first approached the correction of bad sound conditions on the basis of reducing vibration to prevent wear and damage to equipment. Then consideration was also given to the human angles.

One well-remembered instance was an annoying vibration set up in the tool room by heavy cranes in an adjacent section of the building. The jarring was so bad that it affected the finish-cutting operations of several machine tools in the area.

Before starting any corrective measure we decided it would be advisable to have some means of measuring results. We did not have a decibel meter at the time to help us in our work. So, we fastened a contact microphone to one of the crane runway beams and connected it to an Esterline recording wattmeter. By leaving this arrangement in effect for several weeks, we were able to get readings before and after taking corrective measures. In this case, by cushioning the crane rails, we reduced vibration by 80 per cent. Although we could not measure the noise level reduction, we felt that it was reduced satisfactorily.

After the procurement of a decibel meter and an analyzer, we set up a program of making tests in the plant. To get the program underway, the plant was divided into areas and readings were taken in each of these. It was felt that such readings would not only give us an indication where the conditions were most serious but also would serve to give us some experience in operation of the instrument. When a reading of 85 or over was registered on the meter, the location of the test was noted for further study to be made as soon as possible.

For keeping track of the readings, we indexed loose leaf notebooks by departments. In these the "before and after" charts, Fig. 1, were inserted together with the history of each case studied. Total machine and background noise were entered as a red curve, and the equipment noise in blue.

One outstanding case of noise reduction resulting from our program involves chipping operations in which air chisels are used on iron castings. In this area where operators wore ear plugs our meter showed a reading of 95 decibels.

To cut down on the chipping noises, we built booths, Fig. 2, measuring 12 ft square and 8 ft high. The walls are of plywood and are covered on the inside with 9 in. square acoustical tile. When the job was proposed, the chippers were not too much in accord with our way of thinking but after a trial they were pleased with the noise reduction job.

Brief study indicated that there was some need for sound correction in the personnel department office area. Here, several small offices are located along the walls of one large room. This arrangement produced a disturbing factor in that employees working outside the small offices could easily hear ordinary conversation in any one of the small rooms.

In the way of a solution to this

Fig. 1. Curves on chart result from readings taken near pneumatic chipping operations; note drop in level in bottom curve plotted from readings after treatment

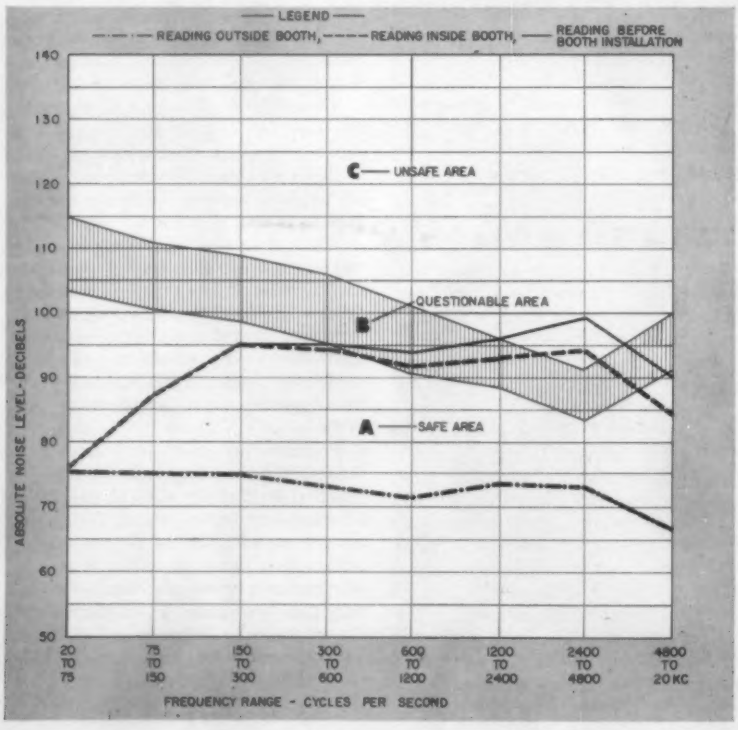


Fig. 2. View shows typical use of tile in chipping enclosures

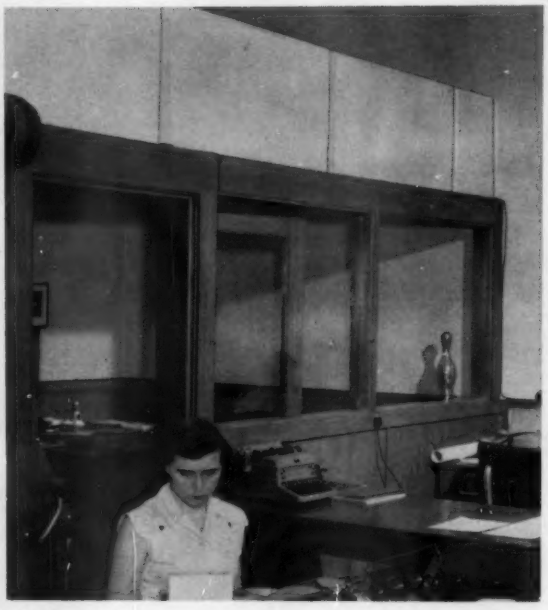


Fig. 3. Baffle on top of the partition cuts down office noise

particular problem, we have installed 2 by 12 by 14 in. acoustic panels on the top edge of the office partitions, Fig. 3. This proved to be a step in the right direction inasmuch as the meter reading showed a reduction by 35.

An expriment is being tried by us, in connection with office jobs, which may also be of value to others. We have put to use an inexpensive record player to help us make noise level readings in unoccupied offices. Record speed, and volume are kept constant in all tests and the same record is used. The phonograph is centrally located in a chosen area and while the record is playing, decibel readings are taken at critical spots. These readings are plotted on a chart in relation to the location at which they are taken. After corrections in the acoustics are made, we take "after" readings to determine how much good has been done.

It was found, in another case, that shop noises were rebounding off a cement block wall and affecting the testing of intricate machines in a fenced in area. The entire wall was covered with acoustic panels in a staggered manner to absorb and break up the sound. This, together with some changes made in the operation of an overhead crane, resulted in a decibel drop from 90 to 70.

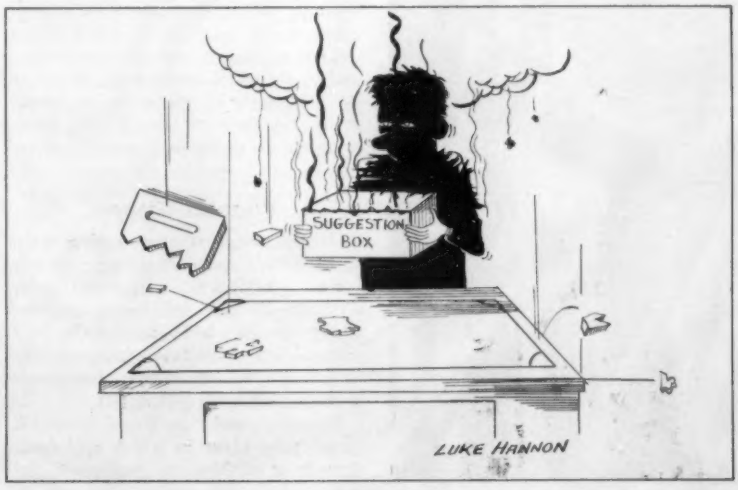
Another room, formerly used as a locker room had a glazed tile wall. We planned to use this room temporarily for engineering work. To make it more suitable for this purpose, we constructed a removable acoustical barrier around the room starting 4½ ft from the floor and extending to 8½ ft. In addition to dropping the noise level of the room by 10 decibels, the appearance of the room was improved.

In the operation of screw machines, crooked stock whipping around in the feed tube can produce an awful clatter. An application of the undercoating material used on autos did the trick for us in silencing this racket.

Although audiometer tests on all employees were started by us in 1946, we did not have a specially treated room for this purpose until 1950. We rebuilt a 10 by 12 ft enclosure which was formerly used as a medical department store room. After installing a tile floor, acoustically treating walls and ceiling, silencing a noisy ventilating fan and rearranging some plumbing in an adjoining room, we got the decibel reading down to 30 in the 300-600 frequency range.

We have to date, three sets of four books, each containing records which may prove valuable in the future. It is the duty of the noise tester to keep these books up to date. I keep one set in my office and the medical and plant engineering departments have one set each.

It is difficult to say exactly what, or how much benefit we have derived from our efforts in noise abatement. It is one of those preventive things that cannot be put on paper. We know that in our plant we have had excellent co-operation and many favorable comments relative to our accomplishments. Further than that I believe that nothing but good can come of it.



Carnation's Labs — Seventy-Five Plants In One

Laboratories, pilot plants, production lines for all of the varied products of this company and its subsidiaries are operating under one roof . . . Flexibility of arrangement makes quick plant changeover possible

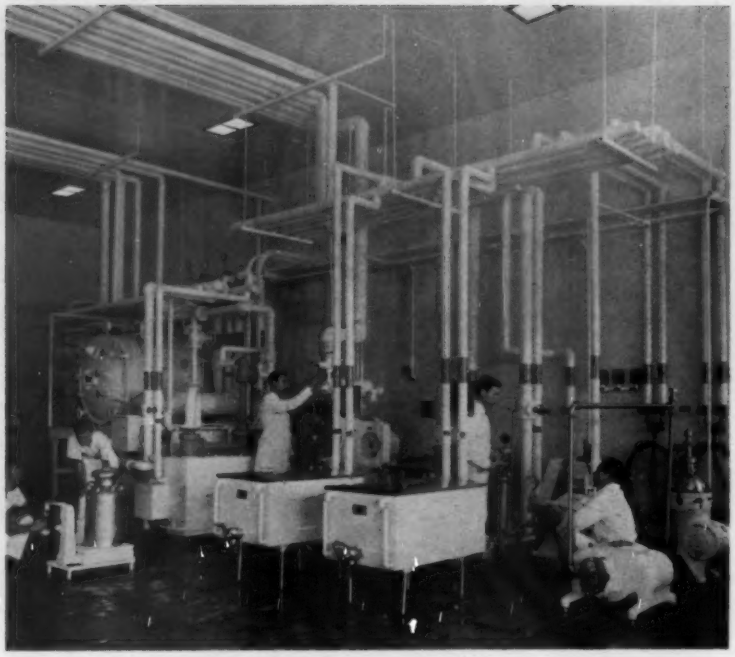


Fig. 1. View of the wet pilot plant for the processing of fluid milk

SEVENTY-FIVE PLANTS in one —that's what Carnation Co. got for the nearly $750,000 it recently invested in a 31,000 sq ft Research Laboratory in Van Nuys, Calif.

This facility, which consolidates the work of three former labs, goes a step further: is, in effect, a small-sized replica of Carnation's far-flung production lines.

Fig. 2. Piping in the wet plant is coded, just as it is in large plants

The new lab can do everything any Carnation plant anywhere can do . . . but on smaller scale: it can evaporate milk, produce ice cream, process grains into livestock feeds. It can and does make cottage cheese, malted milk, homogenized milk. It can produce corn flakes and a wide variety of breakfast cereals. The new facility has a miniature "production line" for each of these processes.

Where Carnation's production lines use large machinery, the laboratory's wet and dry "plants" are installed either with pilot-scale machines or with the smallest production machinery manufactured.

Thus, while Carnation's Research Laboratories were built for product experimentation, they also reproduce under controlled conditions: 1. what the company's 75 plants are currently doing full-scale; 2. what they may some day be doing in quantity production.

Frequent Changes

All this means frequent taking down of laboratory lines, installing new and varied machinery, setting up again. And the lab has anticipated frequent change-overs: built into walls and ceilings are adjustable fasteners for attaching or relocating equipment without damaging the finish.

As an example: in the 40- by 60-ft "wet" pilot plant in which milk production of all kinds is duplicated, the ceiling is inlaid with Unistrut strips on 4-ft centers, running transversely wall-to-wall. To this stripping, pipe hangers may be easily attached and rearranged. Thus, piping can be moved, altered and completely changed within a matter of a few hours—to conform with new experimental set-ups.

The Lab's physical expansion has also been provided for. A 20-ft deep, lab-wide storage room at the ends of both "wet" and "dry" pilot plants has a knock-out floor. That is, its floor is a concrete slab, not quarry tile as the pilot plant floors. If this section is ever needed, the concrete can easily be "knocked-out" because it was poured atop a ½ to ¼-in. layer of sand. Cross-sectionally, this expansion floor consists of a rough bottom slab, 4-in. thick, and level with the bottom slab of the labs. Atop this lies the sand layer, then 3½-in. of finished slab. The isolating sand layer will make tear-up easy.

But let's look at the pilot plant's overall layout.

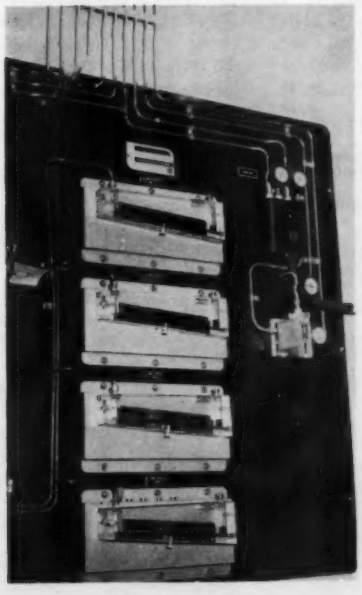
The plant is built on 16 acres in the San Fernando Valley. "T" shaped, the essentially one-story building has six north-facing laboratories (engineering, cereals, bacteriological, biological, processing and analytical); a temperature-humidity controlled instrument room; a room refrigerated to 38-degrees F.; another held at 100-degrees F.; a boiler room and the

Fig. 3. Laboratory where Carnation does research for subsidiary, Albert Milling Co. It has upped production for Albers, too

miniature pilot plants—wet and dry.

The dry plant's flaking rolls, cookers, ovens and puffing gun can produce experimental quantities of cereal products under simulated "big plant" conditions. As an example, it has a room-long steel mezzanine—really a steel platform which can be raised or lowered on 8 supporting wide-flange columns. The dry plant's 30-ft ceiling allows this deck (and another, which may be added) to simulate production techniques in a three-story big plant.

Fig. 4. These manometers are enclosed in a plastic for protection, visibility



There are eight platform-supporting steel columns, 10-in. square, with bolt-holes drilled at various "floor levels." Equipment loaded on this removable platform is, in some cases, set on cork to minimize vibration. Typically, the heavy Allis-Chalmers flaking roll is mounted on 4-inches of cork, completely isolated from the grating and supporting steel beams. Pipes from the experimental production floor below come to the platform through 5-in. diameter, 8-in. high sleeves, welded to and through the grating. Reason: so grating may be raised without injuring pipe insulation. Even should the platform vibrate under machinery load, insulation is protected by being run through these welded sleeves.

One innovation in the lab's basement should see adaption in many another plant. A Minneapolis-Honeywell modulating control panel has all pressure-indicating manometers enclosed in clear lucite. Thus, manometers are tamper proof, stay clean, are readily visible.

How miniature is this miniature plant? Let's consider the corn flakes line—in the dry plant. Whereas a normal Carnation production line would be fed from bins and storage tanks, this line is supplied from 100-lb sacks of grain. Grain first goes to a Johnson rotary pressure cooker (100-lb capacity—about 1/10 normal plant size), then to a miniature, shop-made hot-air dryer 180 F, then to the 20- by 24-in. two-roll flaker on the mezzanine. Flaked material is toasted in a small-size rotary oven (but at regular big-plant temperatures of 400-500 F). Finally the product, finished, is hand-packaged and tested.

Says Phil Sautier, dry plant superintendent, "We bought either the manufacturer's smallest, yet real-life production machines, or made or purchased special pilot models."

A separate system for the chemical effluent drains the six laboratories through Duriron acid piping. Effluents flow to a three compartment clarifier (sealed), are diluted and neutralized. Sink waste tail pipes through the 1st floor to basement are lead.

This pilot plant also has every facility that Carnation big plants have: 1. steam-supplied by a 150 hp Cleaver-Brooks boiler, dual-fueled, gas with oil standby; 2. a minus 20 deg "sharp room"—for hardening and holding ice cream and for holding milk. This unit is a portable aluminum-clad plywood room, its sections bolted together (typical section: 2 by 18 ft). Whereas at Carnation's Los Angeles ice cream and milk plant, the sharp room is some 50 by 50 ft, the pilot plant's is 10 by 18 ft; 3. has machine shops, color coding for all piping.

Fig. 1. Operator at rear of Flow Rack inserts packaged records coming from production areas into proper conveyor slots

Roller Rack Handles Record Flow of Records

Gravity-flow shelving rack puts records in "live" storage . . . Versatile powered belt conveyor serves as fingers for stock-picker . . . Shipping output doubled, time and costs for order filling cut, storage increased with new system

CONVENTIONAL WOODEN storage bins have been replaced by a new live storage system at RCA Victor Record Division of the Radio Corporation of America, in Indianapolis, Indiana. The Flow Rack storage system has doubled stock output, speeded delivery service and at the same time has brought about savings of $1500.00 a month in time and expenses.

Boxes of phonograph records ready for shipment were formerly placed in wooden storage bins, and order pickers used 4-wheel push trucks, moving them from bin to bin, picking stock to fill orders.

With the new system, installed by Rapids-Standard Co., Inc., records move from the production areas to the rear of the Flow Rack on a belt conveyor. The operator at the rear of the rack places the records in their proper storage slot, according to code numbers on the boxes and the rack slots. The slots themselves are separated in five decks, and the seven vertical sections are further divided into conveyors just wide enough to accommodate the small records being produced and shipped.

The records flow by gravity from the rear of the rack to the front or delivery end, on the wheel conveyor sections of which the rack is constructed. A stop at the front end of the rack positions the boxes for subsequent pickup.

Space Saver

Prime advantage of the system is that all records are delivered at the same point for selection. Either one or one hundred records can be selected from the same point, with no need for reaching into deep storage bins.

Another factor of great importance is the increase in storage capacity with no increase in the the floor space. Seventy-two different types (classified by artist, title or size) of records are now stored in an area in which only 40 types were previously stored. A basic space-saving feature is the need for only 2 aisles—one for loading operations and the other for order selection.

Complete separation of loading and order-picking aisles, which were formerly common aisles for both functions, has reduced errors and mixups to a large degree.

RCA General Manager H. M. De Maris devised a special conveyor to augment the rack when large volumes of specific records were needed. A belt conveyor was set on a V-track in front of the flow rack. With electrical controls, the order picker can position the selector-conveyor in front of the bay containing the required stock. Contact with the butt end of the selector automatically retracts the cast stops at the delivery end of the rack, permitting stock to flow by gravity

They don't always tell you about the things they appreciate . . .

No one is likely to come up and thank you personally for the good lighting, or the small comforts you provide for company washrooms.

However, if conditions in washrooms are unsatisfactory, employees feel strongly about them—just as you would yourself. And chances are they discuss this dissatisfaction among themselves.

For instance, nobody likes hard, rough paper towels. That's why it's important to remember soft, absorbent ScotTissue Towels next time you buy. Scott is the brand most people buy for their own homes—and it's natural that they'd like to see ScotTissue Towels where they work.

Your local Scott representative would like to tell you about ScotTissue Towels—especially from a cost and consumption point of view. Phone him today. Also Scott offers a "Planned Poster Program" designed to promote washroom cleanliness. It's yours without obligation—simply write Scott Washroom Advisory Service®, Scott Paper Company, Department PE-3, Chester, Pa.

It's good business to use **SCOTTISSUE® TOWELS**

For more facts circle 508 on Reply Card

Fig. 2. Operator at delivery end uses power conveyor at right for remote pickup of packages from rack for order filling

onto the power belt conveyor which carries the boxes to an outgoing conveyor line for final stamping and addressing.

According to Mr. De Maris, the use of this particular setup has enabled RCA to ship more than 60,000 records in one week—30,000 more than during the previous high week. In addition to the savings of $1500.00 per month and the 100 per cent increase in weekly shipping output, an overhead cost reduction of 10 per cent has also resulted from the installation of the new equipment.

Hydraulic Nozzle Control Steers Water Stream

DESIGNED AND originally used for stripping overburden from gold-bearing gravel in Alaska, a new hydraulically controlled wash nozzle has entered the industrial field.

The Intelli-Giant, manufactured by the Chiksan Co., has proven a valuable tool on dam projects in the Northwest and in the phosphate field at Bartow, Florida. For cleaning overburden, washing mud and rock in dam construction and for making slurries in the phosphate mining operation, the nozzle offers a safe, easily controlled source of high velocity water flow.

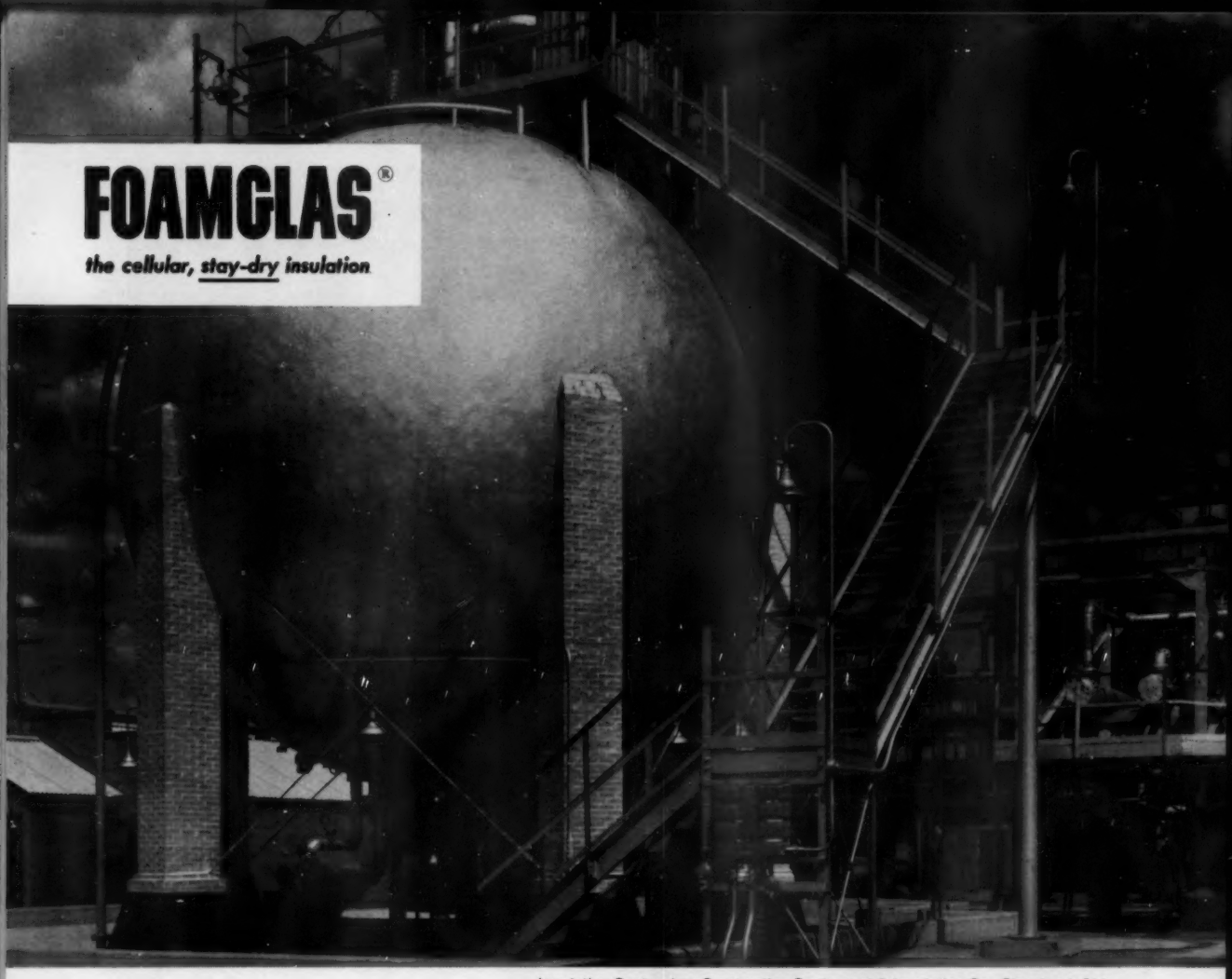
When compared to the former method of directing the stream of water, which employed a pole attached to the nozzle, the new unit provides a more readily maneuverable nozzle, capable of being controlled from a remote location, out of danger from caving banks or flying rock chips. The hydraulic controls can be mounted either at the nozzle, as shown in the photograph, or in a closed cab some distance from the working face.

Remote control also permits the operation of several units from a single station, with resultant labor savings and improved operating efficiency.

The piping design, which passes velocity flow in a manner that minimizes turbulence when changing angles vertically or rotating in a horizontal position, is a step toward control of extremely high velocities with complete safety. The tube turn design incorporated in the equipment passes the center line of the gun barrel over the center line of the vertical inlet elbow. This location gives static balance as well as gravity balance to the vertical moving parts, and allows a simple power factor to be used on both the vertical and horizontal direction.

The control system, which will operate at any pressure from 30 to 300 psi, is supplied from the same source as the water entering the nozzle, and is therefore free of the need for an outside source of power. The entire unit, including the nozzle tip, weighs only 952 lbs.

Old and new control methods for hydraulic nozzle, operating in phosphate field



Insulation Contractor: Combustion Equipment & Insulation Co., Cleveland, Ohio

SOHIO gets efficient desalting because . . .

Spillage-proof FOAMGLAS insulation stays effective to hold precise temperature

Efficient electric desalting to remove salts and other impurities from crude charging stocks demands precise temperature control throughout the process. The influent temperature (180° F to 220° F depending on viscosity of crude) must be held constant until effluence. Since there's no exchange of heat inside the sphere, it must be insulated very effectively.

For six years Standard Oil Company (Ohio) has maintained peak desalting efficiency by insulating their spheres in Cleveland, Lima and Toledo with FOAMGLAS. This unique cellular glass insulation benefits SOHIO three ways:

1. **Spillage-proof,** moisture-proof FOAMGLAS retains its insulating value . . . avoids fire hazard.
2. **Easy-to-apply** FOAMGLAS blocks are lightweight but very strong, readily applied to sphere, eliminating insulation supports.
3. **Effective insulation** holds temperature required for electric field to break continuously the water and oil emulsion. It also prevents temperature drop near vessel wall . . . avoids thermal currents which would interfere with process.

Whether you insulate spheres or piping, buildings or cold storage spaces, it'll pay you to write for FOAMGLAS sample and literature on your specific needs.

Pittsburgh Corning Corporation

Dept. PE-35, One Gateway Center
Pittsburgh 22, Pennsylvania
In Canada: 57 Bloor St. W., Toronto, Ontario

2" thick FOAMGLAS blocks cut to 12 x 12 size were laid diamond shape on SOHIO'S desalter sphere in Toledo. Two Nelson studs were welded through each block and secured with recessed Tinnerman speed clips. After asphalt cutback (Insulmastic 4010)—glass fabric—cutback application, the surface was finished with an asphalt base aluminum paint.

For more facts circle 652 on Reply Card

Pharmaceutical Company Writes Its Name "Big" to Impress Airport Visitors

THE SIGNATURE TRADEMARK of the Johnson & Johnson Company has just been erected on the rooftop of its Chicago plant, overlooking the City's Midway Airport. Written in metal channel letters faced with back-lighted red Plexiglas, which in themselves are unusual in terms of size, daylight color and nighttime luminosity, the signature spans 135 ft. The 25-ft.-high initial J's are believed to be the largest acrylic-faced letters ever fabricated.

The plastic faces of the letters are illuminated by ½ mile of neon tubing, powered by 125 transformers.

The resistance of Plexiglas to impact and weather, and the protection that it gives the light sources result in low maintenance costs for the sign. The Plexiglas in the sign was manufactured by Rohm & Haas Co., Philadelphia, Pa.

Aircraft Structurals Checked for Flaws in Largest Dy-Chek System

LARGEST IN THE NATION, a Dy-Chek inspection facility has been installed by Northrop Aircraft, Inc., at its Hawthorne, California plant, for the production line inspection of major components for Air Force jet planes.

A dye penetrant method of inspection, the process depends upon the controlled use of a red dye, together with other liquids, to indicate the presence in metal of minute cracks not otherwise detectable. When applied to the surface of metal, the Dy-Chek process causes a crack or other opening to "bleed" in telltale red lines, which show up against a white background.

Northrop's production installation at Hawthorne includes tanks which contain the liquids required for the inspection, a drying oven, and a spray booth. Parts are carried in large baskets by an overhead crane system, and are dipped progressively in the dye penetrant, dye remover and spray tank. From there, they are lowered into the drying oven, then removed from the basket and transferred to racks in the spray booth, where the operator applies the dye mark developer. As the developer is applied, flaws in the metal show up as a scarlet bleed.

Precast Concrete Used for Grade Beams Speeds Building Construction

PRECAST CONCRETE GRADE BEAMS saved two weeks of construction time per building on a compressor station and an auxiliary structure built recently for a natural gas utility at Adaline, W. Va.

The precast method afforded several advantages, according to E. S. Wright, manager of construction for Chemical Plants Division, Blaw-Knox Co., Pittsburgh.

Construction progress is more continuous—six identical horizontal form panels were used for the compressor station, and were poured in 3-day cycles, simultaneously with the building piers. Form building is minimized—multiples of one standard form were less expensive, less complicated.

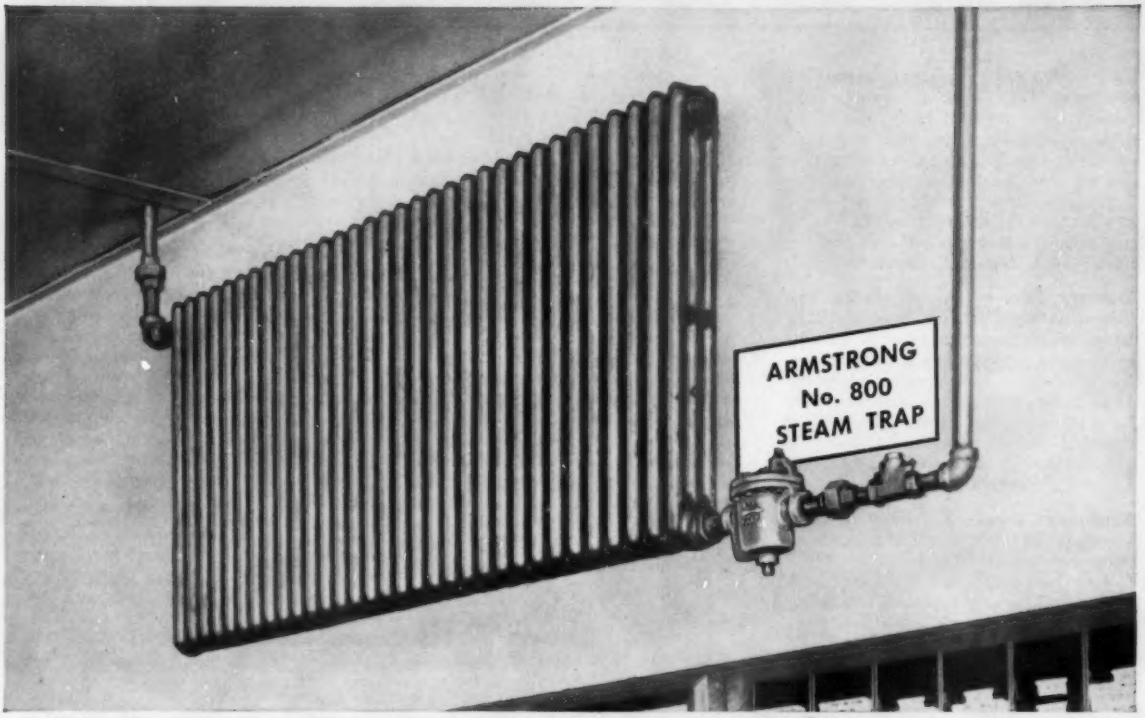
Excavation is limited—excavation opened a strip of earth wide enough to set panels only, since no room for workmen was required. Ground level work goes faster—setting reinforcing rods, placing form panels for wall apertures and pouring was facilitated with work on the ground level. Stronger beams are produced—there was less chance of producing a honeycombed wall with a horizontal pour of nine inches, on the ground level.

Only two different forms were used to cast all grade beams for the Adaline Plant. The form for the compressor building was 6 ft 9 in. wide, 18 ft long and 9 in. deep.

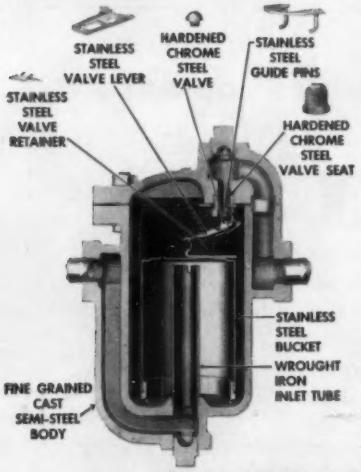
The auxiliary station panels were cast 2 ft 9 in. wide, 18 ft long and 9 in. deep.

Lifting lugs were cast with beams to facilitate placement by crane. These were cut off after the panels were in place. After placement, reinforcement rods extending from the panel ends were welded to adjacent pier reinforcements. Placing forms on each side of the junction, a simple pour made the foundation continuous and unbroken.

Companions for 11 years at 5 psig, 7" Hg. . . .



Armstrong Trap Maintenance: 2¼¢ per year


STAINLESS STEEL VALVE LEVER
HARDENED CHROME STEEL VALVE
STAINLESS STEEL GUIDE PINS
STAINLESS STEEL VALVE RETAINER
HARDENED CHROME STEEL VALVE SEAT
STAINLESS STEEL BUCKET
WROUGHT IRON INLET TUBE
FINE GRAINED CAST SEMI-STEEL BODY

● This low pressure heating system trap has same design, materials and workmanship as traps for 900 lb. pressure, 900° F. jobs.

No wonder it lasts so long!

If you are responsible for a low pressure, vacuum return heating system, installation or operation, new or old, can you confidently expect steam trap repair parts costs anywhere near as low as 2¼¢ per trap per year over an 11 year period? That's the service record of over 100 Armstrong inverted bucket steam traps on a 5 lb. steam pressure, 7" vacuum return heating system at Globe Steel Tubes Company, Milwaukee, Wisconsin. It is not an unusual record for Armstrong traps, either. But, repair parts are the small item.

It pays to take a good, long look at steam trapping from three points of view:

1. Trap Maintenance—how much time and nuisance and cost is, or will be, involved in keeping traps operating properly, especially after they are a few years old. Time and again maintenance of Armstrongs has proved to be a fraction of that of the traps they replaced.

2. Holding Vacuum—biggest source of trouble is leaky steam traps! Have you read the article "Flash at Traps" by T. M. Reynolds. If not send for a free copy. It proves that leaks, not flash, are the problem.

3. Heat—how fast can you heat up a cold system and how much heat can you get out of it? Armstrongs discharge condensate at steam temperature as fast as it reaches the trap. And plenty of air handling capacity is built right into the trap. You get fast heat and maintain maximum temperatures all the time.

You have nothing to lose by talking it over with your local Armstrong Representative—remember he sells the traps that are *unconditionally guaranteed to satisfy the user* or the purchase price is refunded. Call him today or write Armstrong Machine Works, 912 Maple St., Three Rivers, Michigan.

Application Engineered

ARMSTRONG STEAM TRAPS

Free "Steam Trap Book"

44 pages of trap data, prices, selection, installation and maintenance information on trapping low, medium and high pressure lines and equipment. Send for it today—no obligation.

Don't forget to ask for the article "Flash at Traps"

For more facts circle 571 on Reply Card

NEW PLANT CONSTRUCTION — advance information on location, costs

Springdale, Ark.—Ralston-Purina Co., 835 South Eighth St., St. Louis, Mo., prepared cereal products, animal feeds, grain specialties, etc., has approved plans for new branch plant on tract of six acres of land, near city limits of Springdale. It will be multi-story type, equipped as a feed mill, primarily for processing and production of poultry food. Cost reported about $450,000.

Denver, Colo. — Sunstrand Machine Tool Co., 2555 11th St., Rockford, Ill., lathes, milling machines and other machine tools, plans new plant at Denver, for production of aircraft and parts. It will comprise a main and one-story building and several smaller units. Cost reported about $4,500,000. Olsen & Urbin, 5 South Wabash Ave., Chicago, Ill., are architects and engineers.

Bridgeport, Conn.—Northeastern Steel Corp., care of Walter P. Jacobs, chairman of board, Hartford Electric Steel Corp., 540 Flatbush Ave., Hartford, Conn., will take over present steel strip mill of Stanley Works, Seaview Ave., Bridgeport, and will extend and improve mill for hot rolled specialty steels. New electric furnaces and other equipment will be installed. Entire project will represent a reported investment of several million dollars.

Wilmington, Del.—E. I. du Pont de Nemours & Co., Organic Chemicals Dept., Rubber Chemicals Div., du Pont Bldg., synthetic rubber, latex, bonding agents, etc., plans new laboratory at Chestnut Run research center, near Wilmington, exclusively for division noted. It will be one- and two-story, about 60,000 sq ft floor space. Reported to cost close to $2,500,000.

Statesboro, Ga. — General Instrument Corp., 829 Newark Ave., Elizabeth, N. J., television tuners and other television components, radio apparatus, has approved plans for new branch plant at Statesboro, on which superstructure will proceed at once. It will be one story, about 100,000 sq ft floor space, and is reported to cost close to $1,500,000, of which close to one-half will represent equipment purchases.

Morton Grove, Ill. — Minneapolis-Honeywell Regulator Co., 2753 Fourth Ave., S., Minneapolis, Minn., thermostats, regulating and controlling instruments and devices for industrial service, etc., has authorized plans for new one-story plant unit at Morton Grove. Equipment and facilities will be installed for greatly increased capacity. Cost reported close to $1,000,000. Ellerbee & Co., First National Bank Bldg., St. Paul, Minn., are architects and engineers.

Terre Haute, Ind. — American Brass Co., Waterbury, Conn., fabricated copper and copper base alloy metal products, including sheets, rods, tubes, etc., has plans maturing for new aluminum mill in vicinity of Terre Haute, where tract of over 300 acres of land has been acquired. It will comprise a number of one-story structures, to be equipped for a rated output of 60,000 tons of aluminum ingots per annum. Cost reported close to $25,000,000. Work is scheduled to begin soon. Company is a subsidiary of Anaconda Copper Mining Co., 25 Broadway, New York, N. Y.

Davenport, Iowa — Aluminum Co. of America, Inc., Davenport, has authorized an expansion program at local plant for increased capacity in aluminum rolling division, for production of wide aluminum sheets. It will comprise a main one-story structure and several smaller units, reported to cost over $5,000,000. Work is scheduled for completion early in 1956. Main offices are in Alcoa Bldg., Pittsburgh, Pa.

Calvert City, Ky.—Air Reduction Co., calcium carbide, acetylene and other industrial gases, industrial chemicals, etc., has approved plans for new unit at local plant, to be equipped for production of vinyl acetate monomer and allied materials. It will comprise several one- and multi-story structures equipped for a rated output of 30 million lb per annum. Cost reported over $3,000,000. Main offices are at 60 East 42nd St., New York, N. Y.

Bangor, Me.—Old Town Shoe Co., Main St., Old Town, Me., has authorized plans for new shoe factory on Hammond St., Bangor. It will comprise a main multi-story unit, equipped for greatly increased capacity. Cost reported close to $500,000. Isidor Richmond and Carney Goldberg, 16 Arlington St., Boston, Mass., are architects and engineers.

Winslow, Me.—Scott Paper Co., Chester, Pa., tissue and other papers, has authorized an expansion and improvement program at branch mill at Winslow, with installation of new paper-making machine and auxiliary equipment. New buildings will be erected. Complete project will represent an investment of about $6,000,000.

Baltimore, Md.—Crown Cork & Seal Co., Inc., Crown Can Div., Eastern Ave. and Kresson St., metal cans, metal caps and closures for beer cans, beverage bottles, etc., has completed plans for new addition to plant on Boston St., to be equipped for lithographed can production. Cost reported about $800,000, with equipment. Work on superstructure will begin soon.

Holyoke, Mass.—Hercules Powder Co., Paper Makers Chemical Dept., resins, resin and wash emulsions, etc., plans expansion in local plant for large, increased capacity of resin products. Additional equipment will be installed. No estimate of cost announced—will represent sizable investment. Work will be carried out at once. Main offices in Delaware Trust Building, Wilmington, Delaware.

Grenada, Miss.—McQuay & Co., Inc., 1600 N.E. Broadway, Minneapolis, Minn., unit heaters, air-conditioning equipment, etc., has plans maturing for new plant at Grenada, to be owned by Grenada County Board of Supervisors and occupied under long-term lease. It will comprise a main one-story building and several smaller structures, to be equipped for large output. Cost reported over $1,500,000. Work is scheduled to begin soon. John L. Turner & Associates, Milner Bldg., Jackson, Miss., are architects.

St. Charles, Mo.—Sterling Aluminum Products Co., 2925 North Market St., St. Louis, Mo., aluminum products for automotive service, and other industrial purposes, plans new plant near city limits of St. Charles, where tract of over 100 acres of land has been secured. It will be one-story, approximately 250,000 sq ft floor space, and is reported to cost close to $3,000,000. Proposed to begin work soon.

Detroit, Mich.—American Metal Products Co., 5959 Linsdale St., tubular type storage racks and other metal storage products, has plans for one-story addition to plant for considerable increase in present capacity. Proposed to begin work on superstructure at once. No estimate of cost announced—will represent sizable investment.

Detroit, Mich.—Peerless Cement Corp., Free Press Bldg., portland cement, has plans in progress for new cement mill unit in vicinity of present mill on East Jefferson St. It will comprise

For more facts circle 572 on Reply Card →

ACCO products

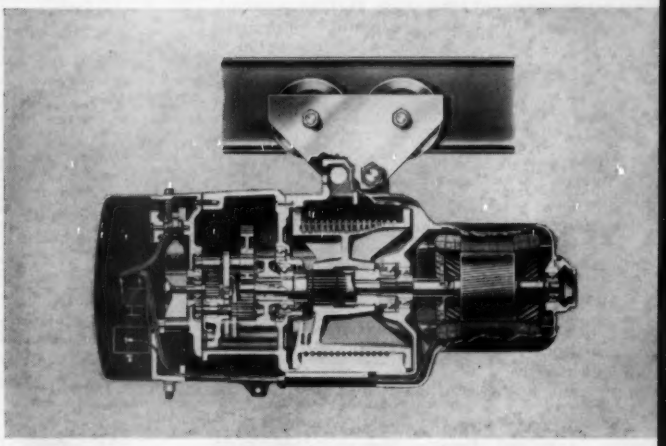
Why WRIGHT *Speedway* Hoists Merit Full Confidence of Both Production and Maintenance Men

Wright Frame 1 Speedway ¼ to 1-ton

It's a heavy-duty workhorse for Production Men...

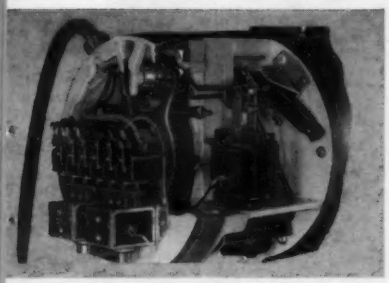
because of sound, generous and practical design of all components, plus standard NEMA specification totally enclosed motors. Heavy-duty design and fine balance give users definite assurance that 1954 Model WRIGHT *Speedway* Frame 1 Hoists will handle tough jobs on any duty cycle for which 1½ H.P., 30-minute NEMA motors are satisfactory. We guarantee this.

A New Booklet, #**DH-133B**, tells the full story of the many fully-tested structural, electrical and mechanical features that make WRIGHT Frame 1 *Speedways* ideal for production materials handling work. Write our York, Pa., office for your copy of this book that is pictured below.

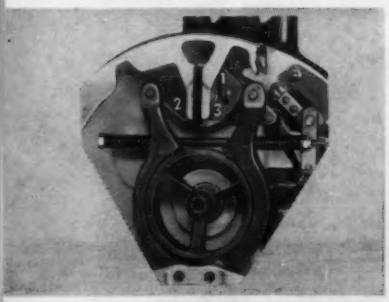


The ideal hoist for production work

It's the easiest hoist for Maintenance Men to service...



Easiest to get at



Nothing to adjust but the cam!

because those components that are most likely to need service or adjustment—on any hoist—are fully accessible when the end housing and side cover are removed as shown in the picture at the left. Removal of housing and cover is a simple matter of loosening or removing a few screws.

To compensate for brake lining wear on the motor brake on these 1954 Model WRIGHT *Speedways*, there is nothing to adjust but the cam. This adjustment is literally "as simple as ABC." Cam settings are pre-determined and numbered. There is no guess work. The long, calibrated compression springs and the solenoid are factory-set... they NEVER need adjustment for brake lining wear.

Write for this New Booklet

Write our York, Pa., office for this New Booklet, #DH 133B. It gives complete information on the 1954 Model WRIGHT *Speedway* Electric Hoists, Frame 1 and 1½ (500 to 4000 lb. capacities). The booklet fully describes the many electrical, mechanical and structural features that make these WRIGHT Hoists ideal for production and maintenance men.

ACCO

Wright Hoist Division
AMERICAN CHAIN & CABLE

York, Pa., Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

Hoists
Trolleys
Cranes

NEW PLANT CONSTRUCTION

several one and and multi-story units, to be equipped for a rated output of about one million bbl. per annum. Cost reported about $6,000,000.

Jersey City, N. J.—N. Somergrade & Sons, 191 Cypress Ave., Bronx, N. Y., bedding products of all kinds, has purchased former plant of American Can Co., 449 Communipaw Ave., Jersey City, consisting of a five-story building, about 135,000 sq ft floor space, and will occupy for plant. Structure will be improved and equipment installed at once. Present factory will be removed to new location. No estimate of cost announced—will represent sizable investment.

Moorestown, N. J.—Radio Corp. of America, Inc., Engineering Products Div., electronic and other engineering equipment and devices, has approved plans for one-story addition to local plant, about 120,000 sq ft floor space, and will begin work on superstructure soon. Cost reported close to $1,000,000, with equipment. Main offices are at Rockefeller Plaza, New York, N. Y. Theodore A. Smith is vice-president and manager of division.

Newark, N. J.—U. S. Industrial Chemicals Co., Div. of National Distillers Products Corp., 99 Park Ave., New York, N. Y., commercial alcohol, solvents, etc., has approved plans for new chemical works for denaturing alcohol, on three-acre tract of land on Doremus Ave., Newark, recently acquired. It will comprise a main building and several auxiliary structures, with pressure steel tanks, etc., reported to cost over $1,000,000. Work will begin soon.

New York, N. Y.—International Paper Co., 220 East 42nd St., plans new newsprint mill on site in South, now being selected. It will comprise a number of one and multi-story structures, to be equipped for an initial capacity of about 100,000 tons per annum. Entire project will represent a reported investment of $20,000,000. It is expected to have new unit ready by close of 1956.

Troy, N. Y.—Fitzgerald Bros. Brewing Co., 498 River St., beer, ale, yeast, etc., will construct new addition to plant for a mechanical bottling unit, to double present capacity in that division. Cost reported in excess of $400,000. Work will begin soon. Company also plans further plant expansion for which details are now being arranged.

Hickory, N. C.—General Electric Co., Schenectady, N. Y., Distribution Transformer Div., electric transformers and parts, has authorized plans for new plant on large tract of land near Hickory, recently acquired, to be equipped for production of distribution transformers, including parts and assembling. It will consist of a main one- and two-story structure, approximating 400,000 sq ft floor space. Machinery and facilities will be provided for employment of about 1000 persons. Cost reported close to $20,000,000. Work will begin soon, with completion scheduled in spring of 1956. Robert & Co., Associates, 96 Poplar St., N.W., Atlanta, Ga., is architect and engineer.

Alliance, Ohio — Alliance Ware, Inc., Gaskill Rd., porcelain enamel products, has arranged for purchase of a one-story building, about 54,000 sq ft floor space, previously owned and occupied by Philco Corp. Property will be taken over at once and will be remodeled and improved for expansion. A division will be removed from present plant to acquired structure and vacated space equipped for increased output. No estimate of cost announced—will represent sizable investment.

Columbiana, Ohio—Kaiser Aluminum & Chemical Corp., 1924 Broadway, Oakland, Calif., aluminum products, refractories, industrial chemicals, etc., has acquired tract of about 100 acres of land near Columbiana, and will use as site for new plant for production of high temperature refractory products. It will comprise a main one-story structure and several smaller units, totaling in all about 125,000 sq ft floor space. Work on foundation will begin soon. Cost reported close to $4,000,000.

Dayton, Ohio—National Cash Register Co., South Main and K Sts., cash registers and parts, has plans under way for new six-story addition to plant, to be used for engineering and research divisions. It will total over 200,000 sq ft floor space, and is reported to cost close to $4,000,000, with equipment.

Kettering, Ohio—Specialty Papers Co., 802 Miami Chapel Rd., Dayton, Ohio, waxed, greaseproof and other processed papers, plans new plant near Woodman Dr., Kettering, vicinity of Dayton, where large tract of land has been selected. It will be one-story, about 125,000 sq ft floor space, and will be equipped with processing machinery and other facilities for large capacity. Cost reported close to $1,000,000. Proposed to begin work in near future.

Mansfield, Ohio—Humphryes Mfg. Co., Mansfield, cast iron and other sanitary plumbing fixtures, has plans under way for new plant for manufacture of vitreous china sanitary ware, to be one-story, about 115,000 sq ft floor space, designed for straight line production, with cost estimated close to $2,000,000. Proposed to begin work in spring. G. W. Kelch is executive vice-president.

Wickliffe, Ohio—Oster Mfg. Co., 2057 East 61st St., Cleveland, Ohio, pipe and bolt cutting and threading equipment, lathes and other tools, plans new plant at Wickliffe, near Cleveland, where site has been selected. It will be one story, totaling over 100,000 sq ft floor space, and is reported to cost close to $1,000,000. It is understood that work will begin in spring.

McKeesport, Pa.—National Tube Div., United States Steel Corp., welded steel tubing, steel pipe, etc., has authorized an expansion program at local plant for increased production of deep-well steel casing for oil well service. Work will comprise additional buildings and installations of new equipment. No estimate of cost announced.

Sunbury, Pa. — Barrett Div., Allied Chemical & Dye Corp., 40 Rector St., New York, N. Y., prepared roofing, wallboard, protective coatings, etc., has purchased an industrial plant at Sunbury, previously occupied by Westinghouse Electric Corp. Property totals about 350,000 sq ft floor space, and will be improved and equipped for line of output noted. Machinery and facilities will be installed for employment of more than 1500 persons.

Houston, Tex.—Gray Tool Co., 6102 Harrisburg Blvd., oil-well drilling tools and other oilfield equipment, plans excreased capacity. Work will comprise one or more one-story buildings, with installation of additional equipment. Cost reported close to $1,000,000. It is understood that work will begin in spring. Wyatt C. Hedrick, 5201 Fannin St., Houston, is architect.

Butler, Wis. — Krambo Food Stores, Inc., 5856 Northport Washington Rd., Milwaukee, Wis., operating a chain of supermarkets, has plans maturing for new warehouse and distribution center on West Hampton Ave., Butler, to be one- and two-story, divided into two main units, 52 by 315 ft, and 70 by 275 ft, respectively. Modern fixtures will be installed throughout, with conveyors, loaders and other mechanical-handling equipment. Cost reported over $800,000. Work on foundations will begin in near future. Sandstedt & Knoop, 22 Otter St., Oshkosh, Wis., are architects.

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...which feature would be most important to you?

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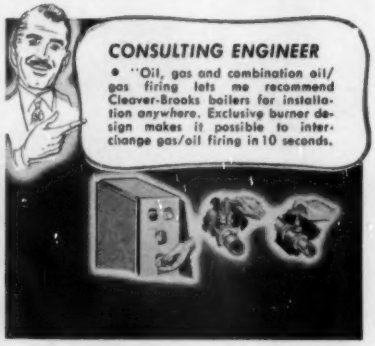
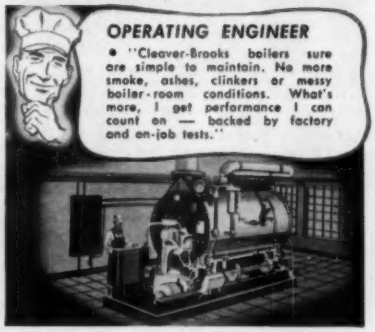
• "Cleaver-Brooks boilers are tops in fuel economy! Forced-draft, four-pass construction and 5 sq. ft. of heating surface per boiler H.P. assure me 80% operating efficiency when firing with oil."

ARCHITECT
• "Self-contained design certainly simplifies boiler room planning — gives owners maximum use from each square foot of space. Gives me flexibility to make best use of low head room conditions."


CONSULTING ENGINEER
• "Oil, gas and combination oil/gas firing lets me recommend Cleaver-Brooks boilers for installation anywhere. Exclusive burner design makes it possible to interchange gas/oil firing in 10 seconds.

CONTRACTOR
• "Boilers are shipped ready to install. With service lines in, my crews have boilers ready for operation in 24 hours or less after delivery. No foundation or stack problems. Cleaver-Brooks furnishes starting service, too."

PLANT SUPERINTENDENT
• "I get all the steam I need for fluctuating steam demands, from full load down to 30% of rating. Automatic burner controls assure instant firing. I call that real dependability."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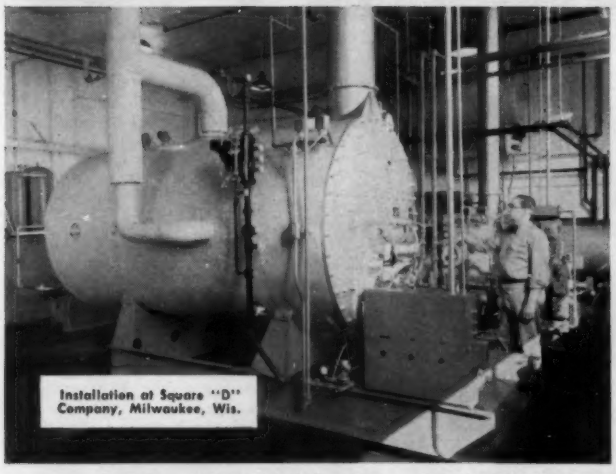
• "Cleaver-Brooks boilers sure are simple to maintain. No more smoke, ashes, clinkers or messy boiler-room conditions. What's more, I get performance I can count on — backed by factory and on-job tests."


Installation at Square "D" Company, Milwaukee, Wis.

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NOW — FIRST SIZES OF THE CB BOILER ARE MADE IN CANADA, TOO.

For more facts circle 573 on Reply Card

NEW PRODUCTS AND PROCESSES summarized for your convenience

Edited by M. E. Heniken

1—STORAGE BATTERY for emergency lighting use

Eight to 12 years of useful life is anticipated for the 3-COE-7 Tytex Battery, a plastic-cased battery designed specifically for emergency lighting. It is announced as approved by Underwriters' Laboratories. Contributing to the battery's long life are ¼-in. thick pasted type positive plates and active material of special formulation. Negative

plates of heavy construction are in balance with positive plate characterstics, says company, and the active material is locked into both plates by a series of horizontal and vertical grid members. This construction is said to assure permanent contact between active material and the grid structures carrying the electrical current.

Short circuits are claimed to be prevented by triple insulation with inert plastic and rubber. State of charge is indicated by colored pilot balls floating in a vertical channel molded into one corner of the polystyrene container and cover. The battery requires addition of water once or twice a year under normal circumstances. Exide Industrial Div., The Electric Storage Battery Co.

More information on any of these products can be yours without cost or obligation. Just circle the item numbers on the Reader Service Cards provided on pages 199-200.

3—HARDNESS TESTER is lightweight, portable unit

Designed to make accurate Brinell tests on non-ferrous alloys, this instrument has a removable test head, which makes it possible to test parts of any size or shape, with the instrument in any position, even upside down, with or without the base. It can be set to pop off at 62½ kg, 125 kg, 250 kg, 500 kg, 750 kg, and 1000 kg—the maximum load that can be applied. Balls of 5 mm and 10 mm are used for various applications; where a small impression is desired, a 5 mm ball with 750 kg load covers the same hardness range as a 10 mm ball and a load of 3000 kg. The tester has a narrow and shallow nose at anvil so that it can be used in small, cramped spaces, tubes or cylinders. Dimensions of this hardness tester are: throat 4 in. deep, gap 10 in. high. It weighs 26 lb. Andrew King.

4—LOW FRICTION PACKING high in tensile strength

Super-Lon is announced as a low friction packing for hot corrosives which will withstand such chemicals as fuming acid, concentrated sulphuric, Oleum or concentrated sodium hydroxide and even aqua regina at temperatures to 550 F. A braided Teflon fiber, it has much greater tensile strength than many types of packings, according to manufacturer, and it will not seize high speed shafts. Chesterton Mechanical Packings.

2—HANDLING SYSTEM saves space, promotes efficiency

The Flow-mation is a materials handling system consisting of work station hopper racks and sliding door boxes that automatically open and discharge their contents. Designed to work in conjunction with the high production demands of plants operating under "automated" systems, the new line is complete—from roll-over and bottom dumps to huge double-size hoppers. It includes a single-station unit that contains both box holding pieces requiring work, and the receiving box in the same rack. This conserves space and increases worker efficiency. The basic unit consists of a box with guillotine type door and a portable hopper stand. When fork lift operator places box on the stand it automatically lifts door, discharg-

ing contents into capacity hopper that is set at a convenient level for working. Powell Pressed Steel Co.

5—MASTIC offers greater safety during application

Spraying of protective mastic coatings onto metal and insulations is relieved of the danger of flash fires with Safetee Mastic (60-80), according to manufacturer. It is said to combine fire safety during application and long, fire-resistive weatherproof protection of the coated equipment. The new mastic is listed by Underwriters' Laboratories for use as a fire-retardant weathercoating on thermal insulation, it is noted, and in addition to its freedom from flammable solvents, it possesses superior "breathing" properties for application over insulation on heated vessels—moisture vapors may escape through the weather-coated insulation without blistering or otherwise damaging the finish. Also, this mastic is claimed to provide maximum weather protection, minimum shrinkage or cracking and also good resistance to attack by chemicals. Benjamin Foster Co.

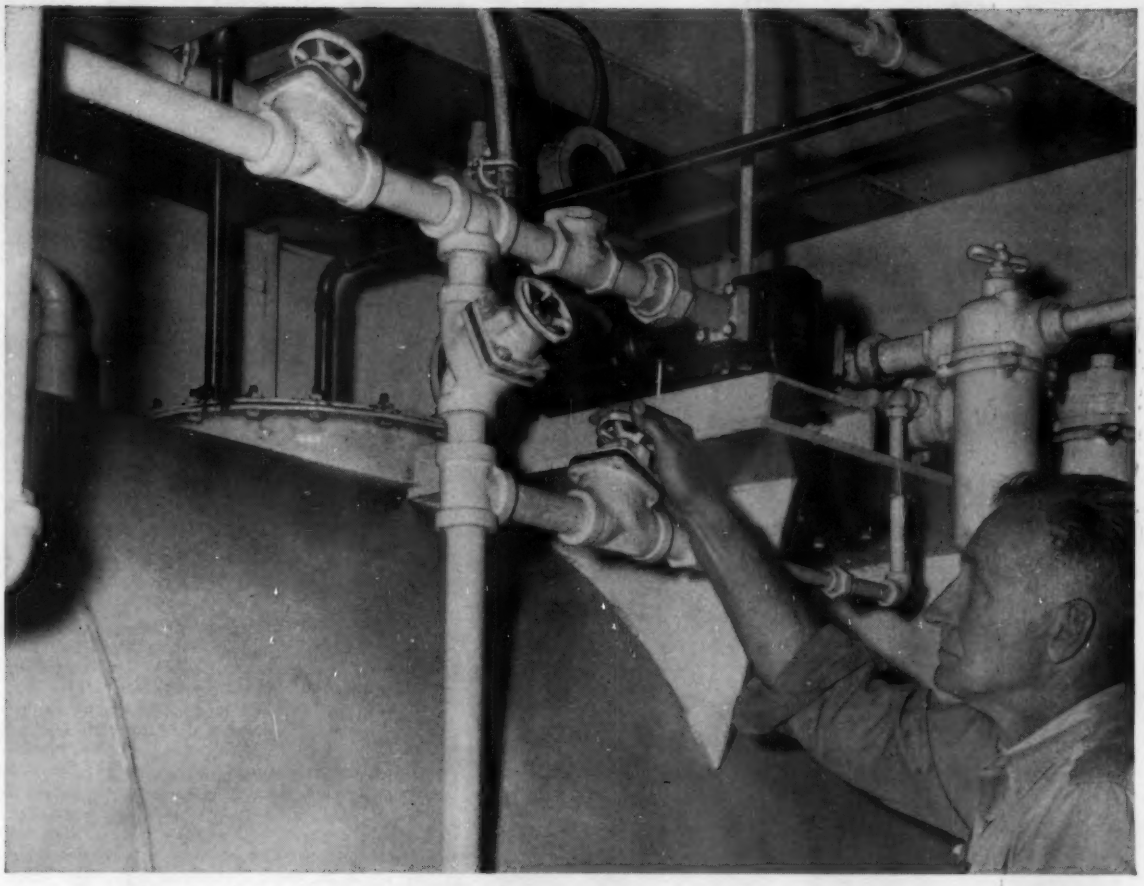
6—HOOK SCALE designed to work without friction

Accuracy of ¼ to 1 per cent of capacity at any point on the dial is claimed for the SU-20 Sensater, a hydraulically operated hook scale. This accuracy is attributed

to a new kind of mobile diaphgram that develops a piston-like stroke—but without a piston rod or packing. The diaphgram does not deflect, it is explained, but moves with its backing plate, transmitting a constantly accurate signal to the gage. Yet it is so engineered that one component does not rub against another, says manufacturer, and since this diaphragm does not stretch, it provides years of service. The new scale is available in capacities of 2500, 5000, 10,000 and 20,000 lb. Martin-Decker Corp.

7—WINDOW PANES are available in built-in colors

Flat Panes are announced as shatterproof, fiber glass window panes in built-in colors. They come in standard glazing sizes in three colors, each designed to solve a specific industrial daylighting problem. "Lite rose," according to company's color researchers, provides warm glow in the



Light oil meets its master in these CRANE VALVES

THE CASE HISTORY— Read how the Johnson & Johnson baby products plant at Cranford, N.J., completely stopped a valve leakage condition that wasted product . . . caused a safety hazard . . . and menaced the plant's high sanitation standards.

Valves formerly used on very light baby oil lines were the source of trouble. Keeping them tight at the stuffing box was next to impossible. Constant servicing of stuffing boxes was necessary, even after repacking every 4 to 8 weeks. Several packings were tried without success while the high maintenance costs and nuisance conditions continued.

Early in 1951 the plant found the solution in Crane No. 1610 Packless Diaphragm Valves. They removed the cause of leakage —immediately stopped its troubles and costs. Almost 4 years later—with no maintenance whatsoever—the Crane packless valves remain absolutely tight; continue giving perfect service. And that goes for all valves added since the first installation.

Crane No. 1610 Packless Diaphragm Valves

When you have valve problems with hard-to-hold fluids, try Crane *Packless* diaphragm valves. They eliminate stem leakage and maintenance on air, vacuum, gas, light oil and similar services. Their diaphragm has longer life, yet should it fail, their separate disc prevents escape of line fluid. Available in wide selection of materials and sizes. Ask for folder AD-1942 or see your Crane Representative.

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Automation

WE'VE WORKED TOWARD IT

FOR 50 YEARS AND CALLED IT

CONTINUOUS FLOW

Typical Mathews conveyer system made up of power conveyers and special conveying machinery in modern brass mill.

Mathews conveyers have for 50 years been helping manufacturers progress toward automation by handling materials to and from processing machines with a minimum of manual effort. Today, in almost every industry in plants throughout the United States and Canada, Mathews mechanized handling is at work creating a smooth, continuous flow of materials.

For information, write to the Mathews field office or plant nearest you. Ask for Catalog 853-R.

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MATHEWS

For more facts circle 575 on Reply Card

NEW PRODUCTS

(Begins on page 134)

gloomiest area, giving a psychological lift. "Cool green" is said to provide stimulating comfort in sunny areas, and "Lite blue" to offer high light transmission under normal plant conditions. Since the colors are built-in, the panes don't require painting.

Another advantage announced for Flat Panes is virtual indestructibility. Made by impregnating tough fiber glass mat with colored polyester resins, the panes are declared simple to install and offer savings in maintenance costs. Although available in five sizes, the panes can be cut to fit other sizes of sash, it is pointed out, and they can be installed in metal or wood frames. Thickness is 0.080 in. Alsynite Co. of America.

8—WATER DISPENSERS serve it cold, or piping hot

Oasis Hot 'N Cold Water Coolers are variations of the bottle or pressure type coolers found in plants and offices. These new dispensers, however, have both the conventional spout for cold drinking water and a spigot which serves hot water at just the right temperature for making instant coffee, chocolate, tea or soup. The cooler-heater combination provides a time-saving method of obtaining hot beverages. It requires no extra space and lets employees have their coffee breaks in or near work areas. Both the pressure type and bottle type coolers have a hot water capacity of 5 qt which serve about 25 cups. Their tanks have a recovery rate of from 40 to 60 cups an hour. Ebco Mfg. Co.

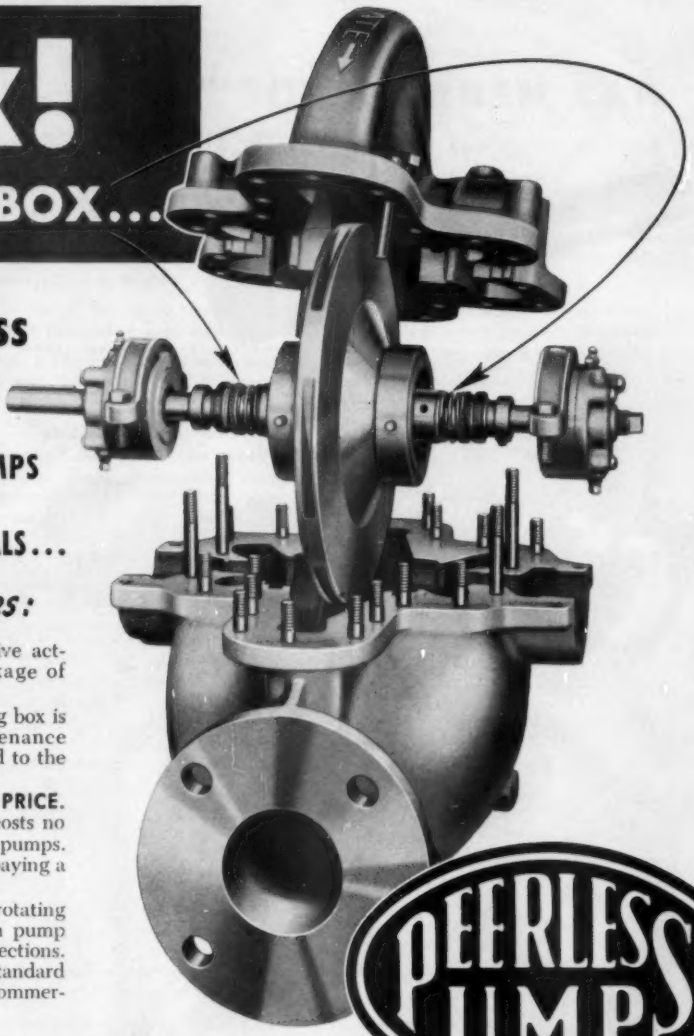
9—ELECTRICAL TAPE does a variety of industrial jobs

Physical and electrical properties of this line of plastic electrical tape qualify it for Underwriters' Laboratories listing as an electrical insulating material and for a wide range of non-electrical industrial maintenance jobs, according to manufacturer. The new tapes are called Behr-cat 507, 510 and 520; they are 7, 10 and

20 mils thick, respectively. According to manufacturer, the high dielectric strength of their vinyl plastic backings—over 1000 v per mil of thickness—gives them superiority over many kinds of tape for electrical applications. Fewer wraps of tape are required for the same electrical resist-

LOOK!

NO STUFFING BOX...

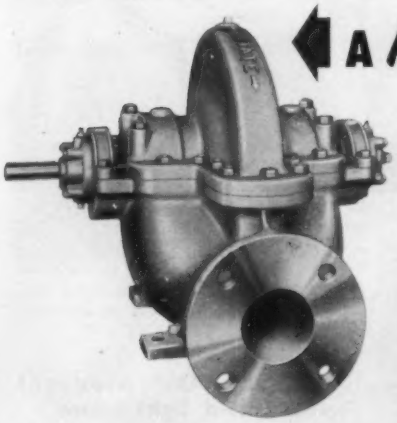


THE NEW PEERLESS TYPE AS GENERAL PURPOSE PUMPS are designed around MECHANICAL SHAFT SEALS...

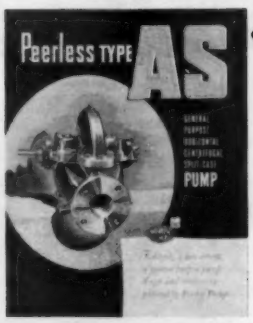
Here are 4 Big Advantages:

1) **NO LEAKAGE.** Simple, positive acting, shaft seals prevent leakage of liquid from pump.
2) **LESS MAINTENANCE.** Stuffing box is completely eliminated; maintenance trouble and expense is reduced to the minimum.
3) ***CUSTOM* PUMP–*STANDARD* PRICE.** The Peerless Type AS pump costs no more than ordinary split-case pumps. You get extra quality without paying a premium.
4) **EASILY SERVICED.** Entire rotating element can be removed from pump without disturbing line connections. Shaft seals and bearings are standard items, easily available from commercial sources.

PEERLESS PUMPS



A *NEW* PUMP
A *NEW* BULLETIN



Write for Bulletin No. B-1350 which completely describes and illustrates the modern design and construction features of Peerless Type AS pumps.

PEERLESS PUMP DIVISION
Food Machinery and Chemical Corporation
301 West Avenue 26, Los Angeles 31, California

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PEERLESS PUMP

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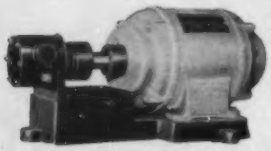
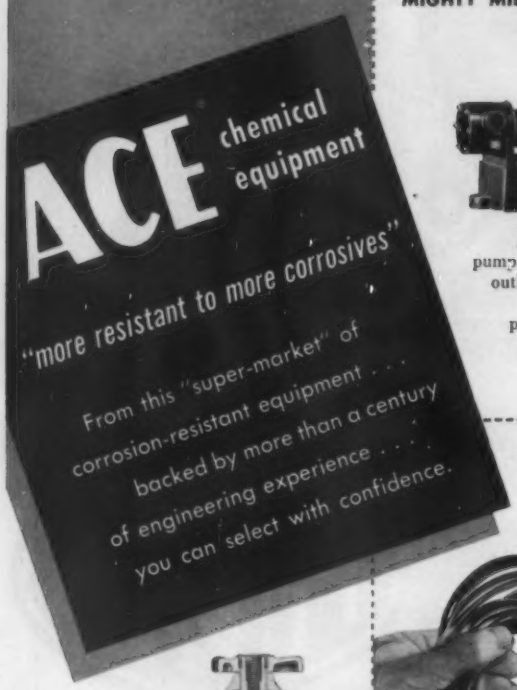
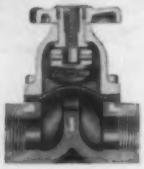
MIGHTY MIDGET

for pumping acids



Jabsco neoprene-impeller pump made of Ace hard rubber outlasts, out-pumps anything in its pressure, size and price class. Capacity from 15 gpm. at 22 ft. head to 5 gpm. at 72 ft. head. *Bulletin 97-A.*


ACE chemical equipment
"more resistant to more corrosives"
From this "super-market" of corrosion-resistant equipment . . . backed by more than a century of engineering experience . . . you can select with confidence.



VALVES

for all-plastic piping systems

Trouble-free plastic diaphragm valves . . . choice of general-purpose rubber-plastic blend, Ace Parian (polyethylene) or Ace Saran. Handles most corrosive chemicals and food ingredients. Sizes ½" to 2", 50 psi. at 77° F. *Bulletins 80 and 351.*

1001 USES *for ACE-FLEX Tubing*

Excellent chemical-resistant, all-purpose flexible plastic tubing. Sparkling clear, easy to clean, odorless, non-toxic, can be steam-sterilized. ⅛" to 1" ID. *Bul. 66.*

ACE rubber and plastic products

AMERICAN HARD RUBBER COMPANY
93 WORTH STREET • NEW YORK 13, N. Y.

For more facts circle 577 on Reply Card

NEW PRODUCTS

(Begins on page 134)

ance, it is pointed out, and with less tape there is less bulk and less time and labor required for application.

The tape is designed to stretch at least 1½ times its length without breaking which makes for conforming ease. This, coupled with its thinness and lightness, permits neat attractive splicing. Excellent results are claimed in junction boxes, electrical harnesses, straight splices, wrapping battery cables, power cable splices, other applications. High resistance to abrasion and corrosion are announced for the tape. The vinyl backing is said to withstand acids, alkalies, water, salt water and oils, so the tape is suggested for production electroplating and anodyzing, and for wrapping subterranean pipe. All three thicknesses come in 36-yd rolls in many widths. The 7-mil type also comes in 20-ft and 60-ft rolls. Behr-Manning Corp.

10—TOWING TRACTOR works indoors or outdoors

Model TU-80—a four-wheel-drive towing tractor—is announced as a low, compact unit powered by gasoline or diesel engine with a drawbar pull of 8,000 lb on dry cement. The 4-wheel drive on large pneumatic tires makes it efficient for both indoor and outdoor work. Over-all height is 61 in. and width 80 in. Maximum outside turning radius is 238 in. Powerful braking action is provided by 4-wheel hydraulic brakes. Combination of torque-converter-drive and four-speed full-reversing transmission supplies the fullest range of speed selection, manufacturer notes, and control for all conditions encountered in pulling or pushing from either end. The Frank G. Hough Co.

11—X-RAY UNIT for industrial applications

Designed for industrial radiography, this 160 kVp portable X-ray unit is said to be ligthweight and capable of X-raying 2 in. of steel. The components are a tube unit weighing 120 lb; a control unit, 60 lb, and lightweight connection and power cables. It operates on 110 and 220 v independent of separate transformers. Focal point in the centrally located and rugged X-ray tube is 1.5 mm, insuring sharp definition in radiographs. Holger Andreasen, Inc.

12—FLOOD LAMP produces controlled light beam

This 200-w PAR-46 flood lamp of the all-glass sealed-beam type, described as a precision lamp, is announced for indoor and outdoor lighting needs. Equipped with a side-prong base, this companion to company's spotlight lamp of the same size and type is designed to provide a controlled beam of light rectangular in pattern. Its glass is said to be thermal shock-proof. Company engineers point

BETTER *Light* FOR BORDEN LAB

New Research Building Features Window Walls of Coolite Wire Glass

The importance of good illumination to industrial research is reflected in these bright walls of Coolite, Heat Absorbing and Glare Reducing Glass. Interiors are flooded with natural illumination, free of the harmful effects of "raw" sunlight that cause optic and physical discomfort.

4800 sq. ft. of Coolite makes these new laboratories appear larger, brighter, more comfortable . . . with plenty of conditioned light for the most exacting scientific work.

Yet, the proven ability of Coolite to absorb unwanted solar heat helps keep interiors cooler. Occupants see better, feel better, work better and more accurately in areas glazed with Coolite.

Coolite Wire Glass protects against shatter damage, resulting from fires. This Approved Fire Retardant No. 32 tends to bottle up and thus prevent the spread of flames. And the Coolite wire glass adds beauty to the exterior—the clean, blue hue harmonizes with the crisp, modern design . . . its benefits minimize need for unsightly painted screens or blinds.

For maximum comfort and protection specify Mississippi Coolite Heat Absorbing and Glare Reduced Wire Glass. Available through leading distributors of quality glass. Mississippi offers a wide variety of translucent, light diffusing glass patterns for every glazing requirement.

Architects: Skidmore, Owings & Merrill
Consulting Engineer: Harry H. Bond
General Contractor: William F. Lotz, Inc.
Glass and Glazing by McKeon, Inc.

Write today for free catalog. Address Dept. 13

COOLITE

MISSISSIPPI *Glass* COMPANY

88 ANGELICA ST. SAINT LOUIS 7, MO.
NEW YORK • CHICAGO FULLERTON, CALIFORNIA

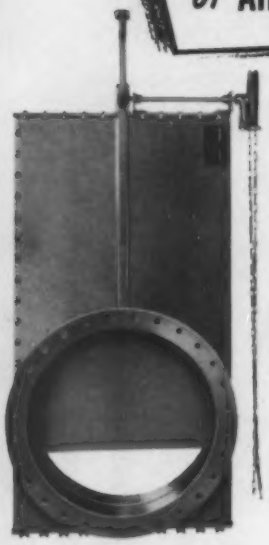
Samples on request.

WORLD'S LARGEST MANUFACTURER OF ROLLED, FIGURED AND WIRED GLASS

For more facts circle 578 on Reply Card

"Slide" or "Blast Gate" *Every Plant Needs 'Em*

for QUICK-EASY CONTROL AND POSITIVE SHUT-OFF of AIR · GASES · LIQUIDS · SOLIDS



The full flow area, easy control and shut-off features of these "Blast Gates" make them dependable units for pipe lines and processing equipment. They are made in any required metals, in 1" to 24" pipe size, with manual or automatic operators, to meet any required operating condition.

Relatively low in first cost, easy to install, rugged, efficient, compact.

Write for Catalog.

Large "Kwikleen" slide valve with chain wheel control; has removable bottom plate and hose connector for quick clean-out of accumulated solids by air, steam or water.

Standard flanged "Kwikleen" valve with hand lever control.

Standard cast iron threaded slide valve with pull handle; available also with lever, handwheel or chain wheel.

Fabricated aluminum slide valve with rectangular opening.

Slide type proportioning valve with air diaphragm operator.

W. S. ROCKWELL COMPANY

ROCKWELL SINCE 1888 BUILT

BUTTERFLY VALVES • SLIDE VALVES • AUTOMATIC VALVES

2925 ELIOT STREET • FAIRFIELD, CONN.

Sales Representatives in Principal Cities

For more facts circle 579 on Reply Card

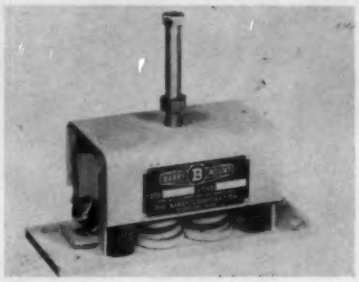
NEW PRODUCTS

(Begins on page 134)

out that lamp produces a "narrow to medium" distribution of light from a compact source. Other advantages claimed are: a smooth beam; flexibility of aiming; and easy maintenance. Included among the various applications are: floodlighting of buildings; supplementary and inspection lighting; and outdoor protective floodlighting. It has a maximum all-over length of 4 in., a life rating of 2,000 hr, and is designed for use in any position. Lamp Div., General Electric Co.

13—MACHINERY MOUNT for low speeds, high impact

Latest of this manufacturer's mobile machinery mounts with leveling features, Spring Mounts are designed for use where high absorption of vibration is necessary or where soft floors make control of vibration frequencies difficult. Available in five sizes with from one to



nine springs, the mounts, depending on size, have a load range of 250 to 6700 lb per mount. Since there is no need to bolt or shim when using these mounts, machines can be installed and leveled within minutes, it is pointed out, and each mount has a built-in adjustment which permits leveling up to ¾ in.

Also announced for the Spring Mount is an adjustable damping feature—simple damping adjustments can be made to prevent sudden spring recoil when a mount is subject to heavy impact and shock and when the mounted unit goes through resonance, thus checking excessive machine motion or bounce. The dampers are faced with friction brake linings, acting on the steel surfaces, which dampen horizontal as well as vertical forces. Spring Mounts are suggested for use with drop forge hammers, heavy stamp presses and hydraulic presses, and in buildings with flexible wooden floors or on balconies where the building construction creates difficulties for effective vibration isolation. The Barry Corp.

14—ARC WELDER has five-range control switch

This 300-amp d-c selenium rectifier type arc welder with remote control has a 5-range control switch which provides coarse control adjustment with generous overlap between ranges to afford dual control. The rheostat, which can be re-

A completely new and different

PAYLOADER®

TRACTOR SHOVEL

NEW MODEL HA

BUCKET CAPACITY
18 cu. ft. PAYLOAD
14 cu. ft. Struck-Load

NEW standards of safety, capacity and low maintenance

The greatest advance in tractor-shovel design in years — with more features — more digging power — more capacity — more performance than you ever thought possible in a tractor-shovel of this size.

The famous HA "PAYLOADER" has led the industry for over 15 years — this NEW 1955 Model HA is even more sensational. It has twice the digging power, lifting capacity and carrying capacity — has 16⅔% more bucket capacity — 18% more dumping height — and will increase output from 50 to 100%.

Before you buy any tractor-shovel, see this new Model HA — ask your dealer for a demonstration — find out what it can do to reduce *your* bulk material handling costs.

PAYLOADER®
MANUFACTURED BY
THE FRANK G. HOUGH CO. • LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

Outstanding features:

Powerful "break-out" digging action Upward rotation of the bucket combines with forward motion of machine in a powerful slicing action that gets full loads quickly, even from lumpy, sticky or heavy materials.

Bucket tip-back of 40 degrees when only 6 inches off the ground carries heaped loads *low* and *close* for maximum stability, balance and safety.

New standards of safety Boom arms and parts are mounted *low* and carry loads *low* and are always clear of the operator. Operator visibility is good at all times.

Advance-design hydraulic system includes: sealed, pressurized hydraulic tank — no breathing of dirt and grit into hydraulic fluid; hydraulic accumulator prevents pressure shocks — gives easier, safer control.

Torque-converter drive and full-reversing transmission with two speed ranges insures fast moves in either direction — easier operation and control — more production.

Improved steering. Ball-bearing screw-and-nut type steering with tapered roller bearing bell crank and oversize ball joints — easy-acting, readily-adjusted, low in maintenance.

GAS OR DIESEL POWER OPTIONAL.

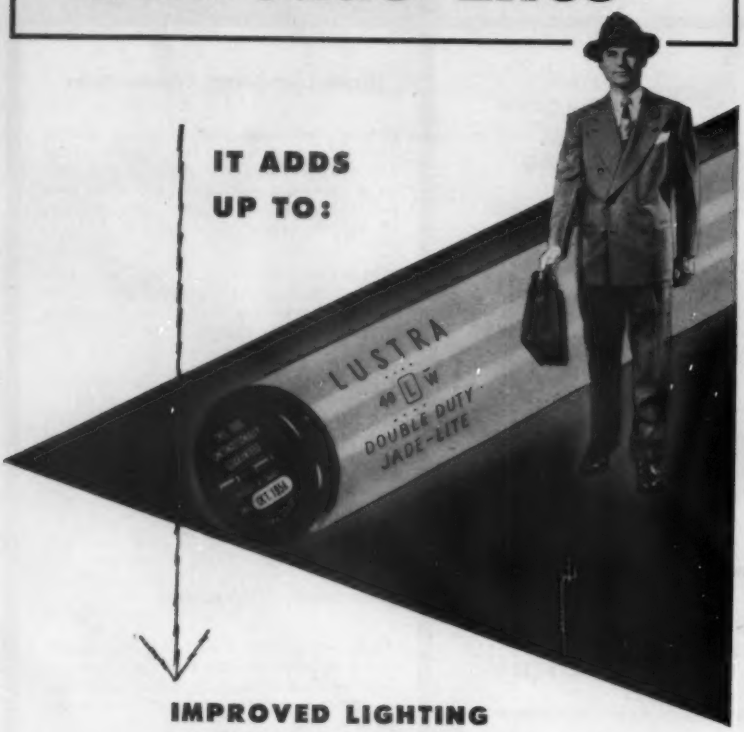
THE FRANK G. HOUGH CO.
770 Sunnyside Ave., Libertyville, Ill.

☐ Send me complete model HA information
☐ Send name of my "PAYLOADER" Distributor

Name .....
Title .....
Company .....
Street or Box No. .....
City ..... State .....

For more facts circle 580 on Reply Card

HIGHER PRODUCTION and LOWER COSTS with Jade-Lites



IMPROVED LIGHTING EFFICIENCY with Lustra Jade-Lite Fluorescent Tubes because of—

LESS GLARE, which in turn—

ELIMINATES EYESTRAIN in close, critical work areas, with the result that—

PRODUCTION IS STEPPED UP SUBSTANTIALLY!

Your local Lustra Man, a Lighting Specialist, is equipped to prove these statements—to help your organization up production and increase profits. For information, write **Lustra Corp., Dept. PE-3, 36 Washington St., Brooklyn 1, N. Y.**

Lustra
AMERICA'S DATED LAMPS

For more facts circle 581 on Reply Card

NEW PRODUCTS

(Begins on page 134)

moved for remote control, provides continuous control by adjusting the d-c through the control coils. These controls provide a wide welding current range of 35 to 425 amp for use with a variety of electrode sizes for repair, maintenance and production welding. A firmly welded core of electrical steel and the absence of moving iron core or adjustable air gaps, manufacturer points out, assure exceptionally and permanently quiet operation. For easy handling by crane or hoist a sturdy lifting eye is provided. It can also be supplied with portable mounting. Hobart Bros. Co.

To receive product data circle item number on the handy Reader Service Cards provided on pages 199-200.

15—SPRAY COATING for corrosion protection

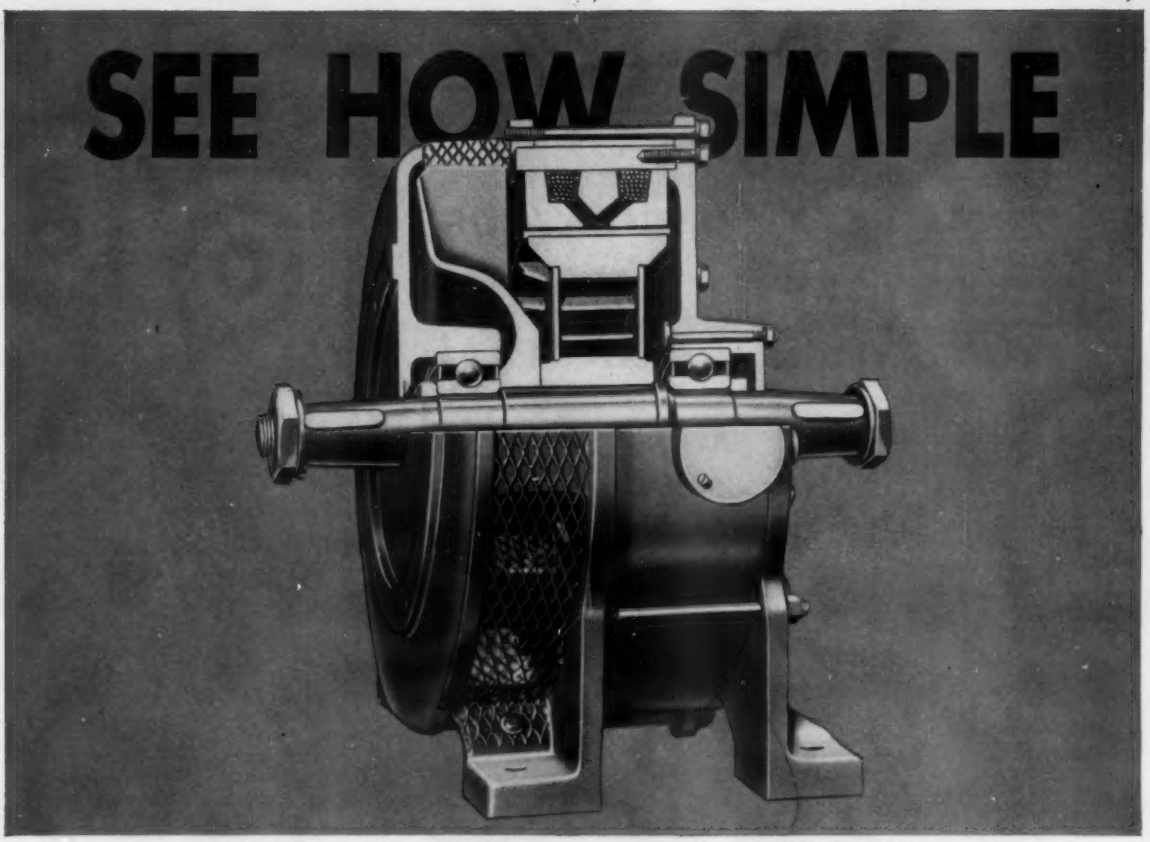
Bitumastic K is announced as a spray coating for metal equipment that combines protection from corrosion with a moderate degree of insulation. Black in color, the product is made of processed coal tar pitch mineral filler, solvent, and granulated cork. Requiring no primer, one application is said to produce a protective covering up to ½ in. in thickness. The mastic was designed for use in locations where metal tanks containing heated materials require corrosion protection, as well as insulation, to prevent major heat losses. It may be used where massive insulation, installed at much greater cost, is not required. Such combined protection is best suited for oil storage tanks, asphalt storage tanks, any metal tank whose contents are kept at temperatures to 150 F, chemical plants or equipment, corrugated steel sidings, and ducts. Tar Products Div., Koppers Co., Inc.

16—STEAM-WATER MIXER supplies hot water

Utilizing full heat energy by injecting steam directly into the water, this steam-water mixer (1360 series) is announced for use wherever hot water is required and steam and water are available. It has a wide range of adaptability, including wash wheels in laundries and tanneries; wash water in textile mills, sugar mills, chemical plants, and in supplying hot or warm water to wash stands and gang showers. A safety feature is incorporated to shut down mixer in event of failure of water supply, and automatically resume operation when corrected.

The sensing bulb design has more surface area than usual, company says, and the turbulent blending action on interior produces instantaneous response of thermostatic assembly and assures accurate control of water temperature at desired point. The mixing chamber is designed

SEE HOW SIMPLE



... and only P&H overhead cranes have this better AC CONTROL . . . MAGNETORQUE*

Here is what all the talk is about in modern crane control. This is the P&H Magnetorque unit . . . so simple it never requires maintenance.

In this AC crane control there are no rotating electrical parts, never any adjustments to make, no replacements ever needed. With Magnetorque, braking forces are exerted electro-magnetically — without friction, without wear.

As for performance, *this* control provides infinitely fine speed-load characteristics. It's the most responsive crane control yet devised.

Magnetorque is only *one* of the features which distinguish P&H Overhead Cranes as leaders in the field. You can always look to P&H for what's new and better in overhead cranes — soundly backed by the experience of America's oldest and largest producer.

*T.M. of Harnischfeger Corporation for Electro-Magnetic Type Brake.

COMPARE FOR YOURSELF. This new literature contains speed-load curves for all types of crane controls printed on transparent pages so that you can compare one with the other. It clearly explains Magnetorque, has other helpful information. Write for Bulletin C-50.

P&H OVERHEAD CRANE DIVISION

HARNISCHFEGER CORPORATION

MILWAUKEE 46, WISCONSIN

the P&H *Line*

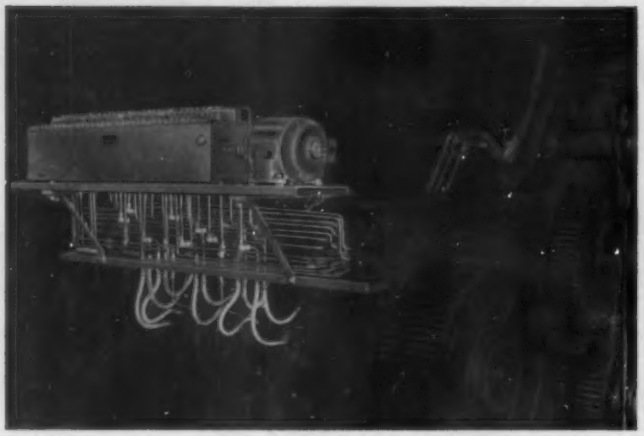
For more facts circle 582 on Reply Card

MANZEL

FORCE FEED LUBRICATORS

COST LESS...

than doing without them!



Pressure Application — Exact Amounts — Accurately Timed

* Manzel Force Feed Lubricators quickly save their cost by preventing breakdowns due to faulty or forgotten lubrication — by reducing the quantity of lubricants used — and by eliminating the labor of hand oiling. They keep vital parts properly lubricated for uninterrupted production efficiency round the clock.

You can have Manzel Force Feed Lubricators installed on present equipment or engineered into new machinery. Write for information.

Manzel

DIVISION OF FRONTIER INDUSTRIES, Inc.
301 BABCOCK STREET, BUFFALO 10, NEW YORK

For more facts circle 583 on Reply Card

NEW PRODUCTS

(Begins on page 134)

to prevent stratification and false temperature indications. It is also claimed that inherent noise accompanying injection of live steam into water is held to acceptable level by a variable orifice feature of the steam injection nozzle. Available in five temperature ranges, the control costs about 15 per cent less than company's previous models. Fulton Sylphon Div., Robertshaw-Fulton Controls Co.

17—REFRIGERATOR DOOR is electrically-operated unit

Designed for all types of cold storage, this electrically-operated automatic refrigerator door is the latest addition to company's Prest-O-Matic line of industrial door units. It is said to be well suited for frozen food lockers and refrigerated compartments. Fiberglas insulation is used in the door sections and temperature interchange is further minimized by the use of rubber sealing gaskets to provide tight closure. Manufacturer says the doors open or close in 3 or 4 sec in normal-size openings, averaging less than 10 sec for passage of lift trucks. Although standard types of control are available, company usually recommends approach pull cord or push buttons which do not require the truck operator to leave his vehicle or even stop to actuate doors. These freezer doors are manufactured as complete packaged units, including motor operator, frame, door sections, hardware and controls. Clark Door Co.

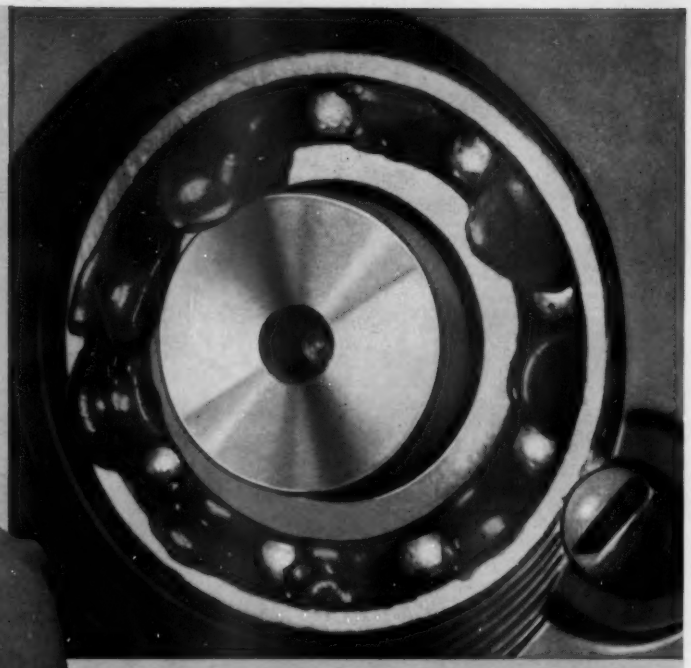
18—PLASTIC PUTTY in tape form, for skylight mending

Mend-O-Lastic Adhesive Bar Cap, a plastic putty in tape form, is dark green in color and described as non-hardening, always ready for placing over the rafter bar. Manufacturer says it may be used easily by anyone and without tools. The roll is simply placed over the rafter bar

and rolled back, using the fingers to tamp down the material as it is unwound. Its 1⅞-in. width is claimed ample to cover both sides of the rafter bar.

Mend-O-Lastic is described as an everlasting repair material and preservative, that will not bleed at 200 F nor crumble at −45 F. It makes a tight seal, says company, and prevents glazing points from rusting, halts glass slipping, and reduces glass breakage because it per-

Motor life vastly increased with U. S. MOTOR TRANSVERSE LUBRICATION



See how it works. The above cut-open view shows how grease extrudes through the bearing transversely when grease gun is applied, forcing old grease out and replacing with fresh new lubricant. Lubriflush is an exclusive U. S. Motors system, proved by 20 years' application.

U. S. MOTORS

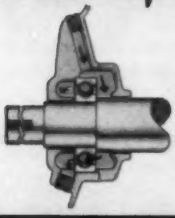
Lubriflush

THE ONLY SYSTEM OF COMPLETE RE-LUBRICATION

without disassembly of motor!

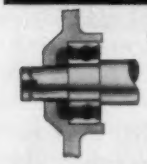
Motor bearing failure is costly. Bearing life is limited to the life of its lubricant. Therefore re-lubrication is a *must*. But to completely re-lubricate any ordinary bearing you have to open up the motor. That costs money – in man-hours and down-time. *The solution* – Install U. S. Motors. Just apply a grease gun once a year. The injected grease is applied *behind* the bearing and is forced transversely through the bearing, ejecting all the old grease out the drain. How simple. How quick. How economical.

Lubriflush BEARING



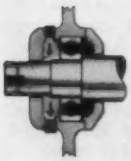
See how the lubricant is applied behind the bearing. It has to go THROUGH the bearing. No dead areas. Largest grease volume surrounds bearings—up to 12 times more than ordinary types.

ORDINARY BEARINGS



CARTRIDGE TYPE

Limited in volume of grease. When grease fails, bearing must be replaced.



STANDARD TYPE

Does not replace worn grease on blind side of bearing.

U.S. ELECTRICAL MOTORS, Inc.
Los Angeles 54, California • Milford, Conn.

GET THIS BOOKLET ON MOTOR LUBRICATION

A real refresher course on motor lubrication. Tells all about motor bearing greasing. Fact-packed pages reveal engineering data that will amaze you. It's free. Send Coupon.

Request for Lubriflush Booklet

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***CONSECO SERVICE** is two-fold.* **On one hand, our engineers will design, redesign, build, erect, and install practically everything in a modern power or chemical processing plant except the building, electrical equipment, and turbo-generator. On the other hand, we will dispatch an expert crew to your plant for retubing, rebuilding, and maintenance of any type of tubular equipment, or metallizing . . . ANY HOUR, DAY or NIGHT, SUNDAYS and HOLIDAYS. Conseco's coordinated manufacturing and maintenance services meet every need in the Power and Processing fields.**

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Designers and Builders of Equipment for Power, Refining, Chemical and Marine Industries

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Equipment Designed and Built by CONSECO

Conseco and its subsidiaries design, build, and install power and processing equipment and accessories, some of which are listed here. Purchasers of Conseco equipment benefit from our maintenance division's quarter century experience in rebuilding, modernizing, and maintaining our own as well as competitors' equipment. This coordination assures easy accessibility for maintenance and low operating cost. Send for bulletins covering equipment in which you are interested.

HEAT EXCHANGERS
CONDENSERS
EVAPORATORS
STEAM JET AIR EJECTORS
STEAM GENERATORS
PRESSURE VESSELS
CENTRIFUGES
FILTERS and STRAINERS
PUMPS, INSTRUMENTS, SPECIALTIES

For more facts circle 585 on Reply Card

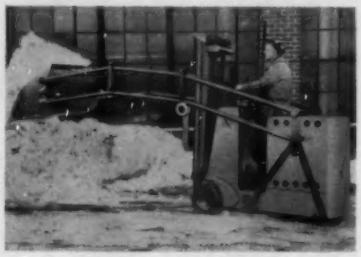
NEW PRODUCTS

(Begins on page 134)

mits normal expansion of glass and frame due to temperature changes. It may be removed and re-used. Besides its use on skylights, it may be cut in strips for calking door frames and around windows. A 12½-ft roll of Mend-O-Lastic costs about $2.00. It also comes in bulk form for calking, hole plugging and other repair jobs. Fennia Laboratories.

19—SCOOP ATTACHMENT for snow removal jobs

Designed for use with the SpaceMaster electric fork trucks, this attachment converts any SpaceMaster into a full-fledged snow-removal truck. It is quickly detachable, manufacturer states, and needs no hydraulic valves or hose line for oper-



ation. The 12½ cu ft capacity scoop is connected to truck frame by a parallel linkage which keeps bottom of the scoop parallel to ground at all times except when dumping. The bottom set of links ride on the rollers mounted on the normal fork carriage. Raising and lowering the carriage also raises and lowers the scoop. The latter is held in position by a latch; to dump the snow, operator trips the latch by a cable from his operating position. This attachment can add to the versatility of any fork truck to handle snow, sand, coal and like materials, with hardly any changes required in the truck itself. Lewis-Shepard Products, Inc.

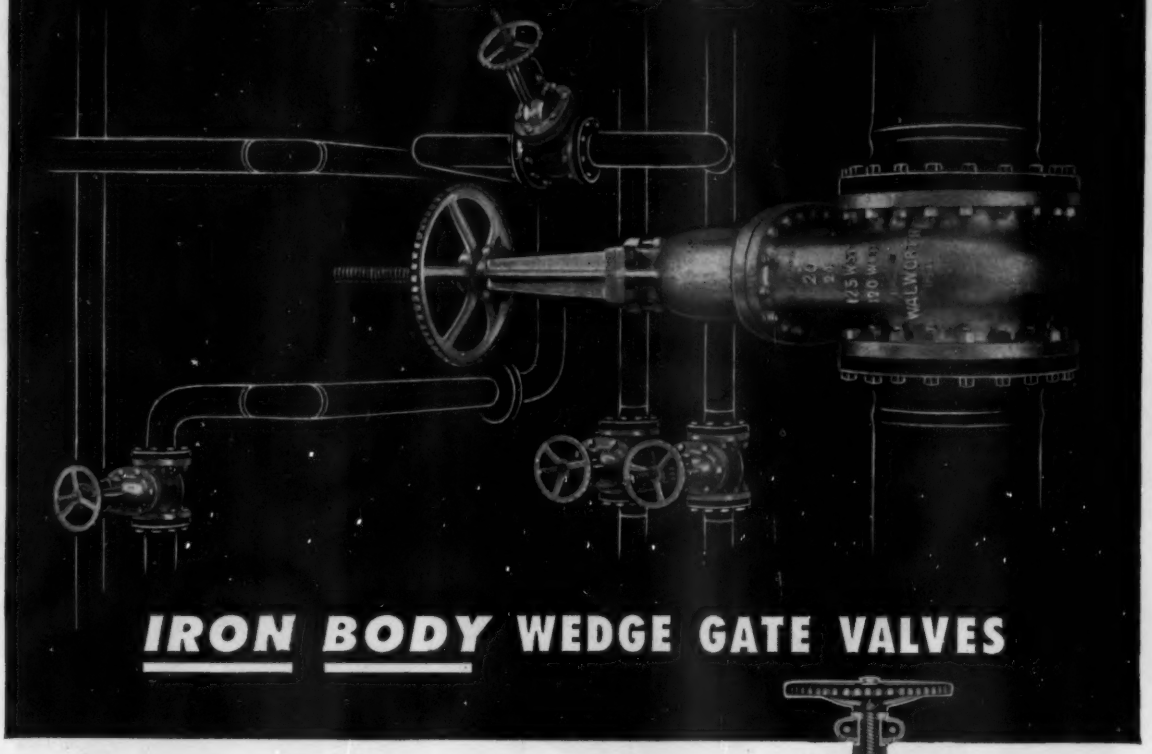
20—FLOOR FINISH for all types of flooring surfaces

Lab-Cote is claimed to be hard, easy-to-maintain and resilient. Manufacturer says this finish protects all flooring surfaces with a clear, transparent film, resists soil absorption, and has high anti-slip value. It is also said to outwear wax dressings many times, to remain buffable and be easily removable. A sample is available. Lab Products.

21—SAFETY SWITCH, dust resisting, for heavy-duty use

For heavy-duty industrial use, this Type H safety switch has a dust-resisting enclosure and, for safety during maintenance, Micarta laminated shields over the line terminals. Designed to exceed NEMA and government specifications for Type A switches, it is offered in ratings from 30 to 1200 amp, 600 v and below. In-

WALWORTH

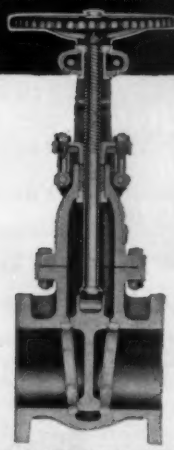


IRON BODY WEDGE GATE VALVES

Better because ...**The entire valve, from handwheel to seat rings, is ruggedly constructed to withstand rough and frequent usage. Body, bonnet, and yoke are sturdy castings with large radius fillets. Dimensions and drilling of end flanges are in agreement with American Cast Iron Flange Standards. Stiffening ribs connect end flanges with the body neck to maintain a rigid connection with piping.**

A wide range of Walworth Iron Body Wedge Gate Valves is available—through your Walworth Distributor—from which you can choose the right type to meet your most exacting conditions. Saddle-type valves as small as ¼-inch; low pressure valves for water and gas pipelines up to 36 inches.

Whenever you need valves and fittings, choose from complete lines—in a variety of metals—manufactured by Walworth. For more information, see your Walworth Distributor or write: Walworth Company, General Offices, 60 East 42nd Street, New York 17, N. Y.



Walworth No. 726F OS&Y (Outside Screw and Yoke) Iron Body Wedge Gate Valve. OS&Y valves are recommended for services where it is desirable that the line fluid does not come in contact with the stem threads. Note the swing-type gland-eye-bolts for easy repacking. Sizes 2 to 30 inches.

WALWORTH

Manufacturers since 1842

valves . . . pipe fittings . . . pipe wrenches

60 East 42nd Street, New York 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

For more facts circle 586 on Reply Card

INDIVIDUALLY
Vacuum-Tested
to prevent leaks!

This True Ball Joint makes the difference

You win several ways with Dart Unions. They're drop-tight. They can be used over and over. They're easy to install. You're ahead because you save (1) the cost of a replacement union, (2) the expense of removing an inferior union and installing a new one, and (3) possible damage to property and materials. Insist on Darts.

QUICK FACTS

- Leakproof because precision-machined to a true ball joint and spherically ground
- Extra wide seats of bronze alloy resist pitting and corrosion
- Heavy shoulders (take severe wrenching without damage)
- Nut and body practically indestructible (of air refined, high test malleable iron)
- Each Dart is individually vacuum-tested — absolutely tight when it leaves the factory

DART

UNIONS

DART UNION COMPANY • PROVIDENCE 5, RHODE ISLAND

The Fairbanks Co. — General Distributing Agents: Boston • New York • Pittsburgh • Rome, Ga.

CALL YOUR LOCAL DISTRIBUTOR FOR PROMPT DELIVERY OF DART UNIONS

For more facts circle 587 on Reply Card

NEW PRODUCTS

(Begins on page 134)

corporation of the operating mechanism within the operating handle leaves the side gutters free from wiring. Copper parts are tinplated to prevent corrosion and oxidation and switch bases are coated with iron oxide to increase moisture resistance and dielectric strength. A neoprene gasket, compressed by truck-type cover latches, provides a cover seal. Westinghouse Electric Corp.

22—INDUSTRIAL FANS come in 14 standard sizes

Higher efficiency, new proportions conforming to latest NAFM standards, an increased range of 14 standard sizes, and choice of wheel types best adapted to specific applications are features claimed for this new line of industrial fans. All-welded steel housings and wheels are used. With the complete line of accessories and modifications, these fans are said to be adaptable to virtually any fume, materials handling, or high-temperature application. The fans are designed to provide maximum serviceability under the corrosive and abrasive conditions of industrial exhaust service. Bulletin EX-531 gives dimensions and capacities. Bayley Blower Co.

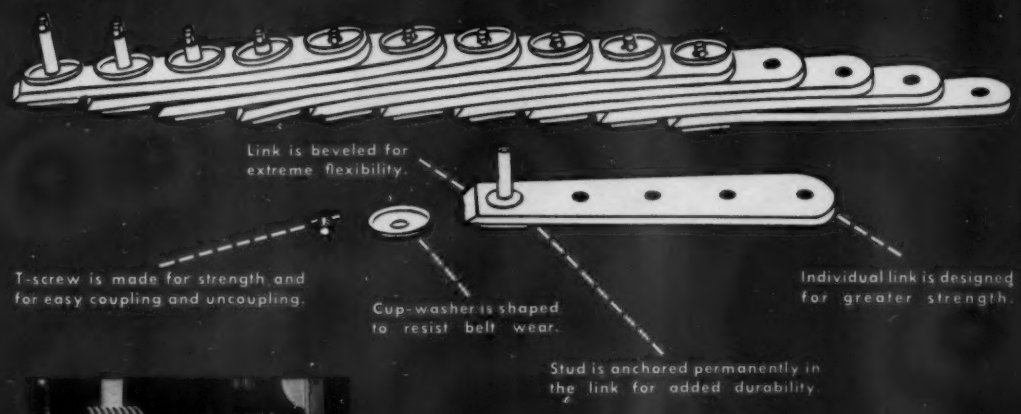
23—GRAPHITE LUBRICANT is jet-propelled

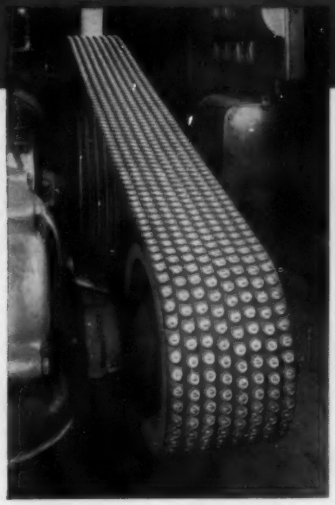
Graph Squirt—a jet-propelled lubricant that reaches many inaccessible trouble spots is announced as a nonflammable lubricant made of colloidal graphite in such fine suspension that it remains floating in a petroleum base. Its other principal components are fluorinated hydrocarbons and methyl ethylene, a grease cutting agent. Because of its low surface tension and high penetration and its propulsion in a jet-stream, Graph Squirt can be applied instantly to clear rusted or frozen locks, keyholes, hinges, and other gummed, clogged or frozen moving parts. Since it can't clog and is not greasy, it can be applied neatly and quickly, not only to correct a condition, but to inhibit formation of rust and gummy substances. The Gebauer Chemical Co.

24—AIR CONDITIONER for multi-room installations

Introduced for year-round air conditioning in multi-room installations, Dual Conditioners use the existing heating piping circuit to cool in summer, heat in winter,

This detailed line drawing of the new, patented Veelos TD and TE v-belt makes it easy to see how this new v-belt is designed to do a better job . . . easier!


Link is beveled for extreme flexibility.
T-screw is made for strength and for easy coupling and uncoupling.
Cup-washer is shaped to resist belt wear.
Stud is anchored permanently in the link for added durability.
Individual link is designed for greater strength.



New VEELOS

TD and TE Adjustable V-belt

So easy to couple *it installs in minutes*

So strong and durable *it lasts for years*

The new Veelos TD and TE adjustable v-belt is the successful development of a specific v-belt designed for a specific service—D and E drives.

This new Veelos TD and TE v-belt has these basic advantages . . .

It simplifies installation. Links are quickly joined by easy-to-use cup-washers and T-screws to make up individual belts. It's the easiest v-belt to couple and uncouple ever developed. And you don't need to waste time removing outboard bearings.

It lasts longer—is more flexible. New high-tensile strength link combined with new stud, cup-washer, and T-screw gives added durability. New link construction provides maximum flexibility for cooler, wear-resistant running.

Get the complete story of this great new v-belt for D and E drives. Send coupon now for new 8-page illustrated catalog.

VEELOS
THE LINK
V-BELT

Veelos is known as Veelink outside the United States.

MANHEIM MANUFACTURING & BELTING CO.
652 Manbel St., Manheim, Pa.

Please send copy of your new Veelos TD and TE v-belt catalog.

Name .....

Company .....

Address .....

.....

POT

ADJUSTABLE TO ANY LENGTH • ADAPTABLE TO ANY DRIVE

For more facts circle 588 on Reply Card

an ACCO product

ACCO Registered* SLING CHAINS

You get more than chain when you buy ACCO Registered Sling Chains

• This 125,000 psi ACCO *Registered* alloy sling chain has great strength, yet it's lightweight and easy for men to handle. It will lift a variety of expensive loads safely over costly machines. You can be sure of that because it's ACCO *Registered*.

ACCO *Registered* is more than a name. It's more than a registered trade mark of American Chain & Cable. It is the standard by which all other slings are judged. It means that you can equip your shop with dependable "lifting tools" specifically designed for highest efficiency and long life by trained engineers who spend all their time designing and testing slings.

A survey of your sling requirements will cost you nothing. See your ACCO *Registered* Sling Chain distributor today or write our York, Pa., office for details. *Trade Mark Registered

WHAT "ACCO REGISTERED" MEANS . . .

1 The best material
2 Unit safety factor (on bodies, rings, links, hooks)
3 Proof test of complete sling to twice the working load limit
4 Actual field service test of each design
5 Metal identification ring on each sling
6 Signed Registry Certificate with each sling

ACCO

American Chain Division
AMERICAN CHAIN & CABLE

York, Pa., Boston, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, Ore., San Francisco, Bridgeport, Conn.

plus Rings Links Hooks

For more facts circle 589 on Reply Card

NEW PRODUCTS

(Begins on page 134)

and ventilate in off-seasons. The system requires no ducts, it is pointed out, and can be used in fire-proof buildings since fumes, smoke or flames cannot be transmitted from one room to another. Each room or area has an individual thermostat and capacity control; each unit is its own zone control, independent of others.

Manufacturer announces a choice of 10 UL approved units to meet varying capacity needs. The cabinets are described as rust proof and sound proof, and can be recessed. In conjunction with the existing hot water boiler, a water chiller is supplied to complete the year-round system. To cool and ventilate only, the Dual Conditioner may be connected to a standard refrigerating condenser unit. Circle Air Industries.

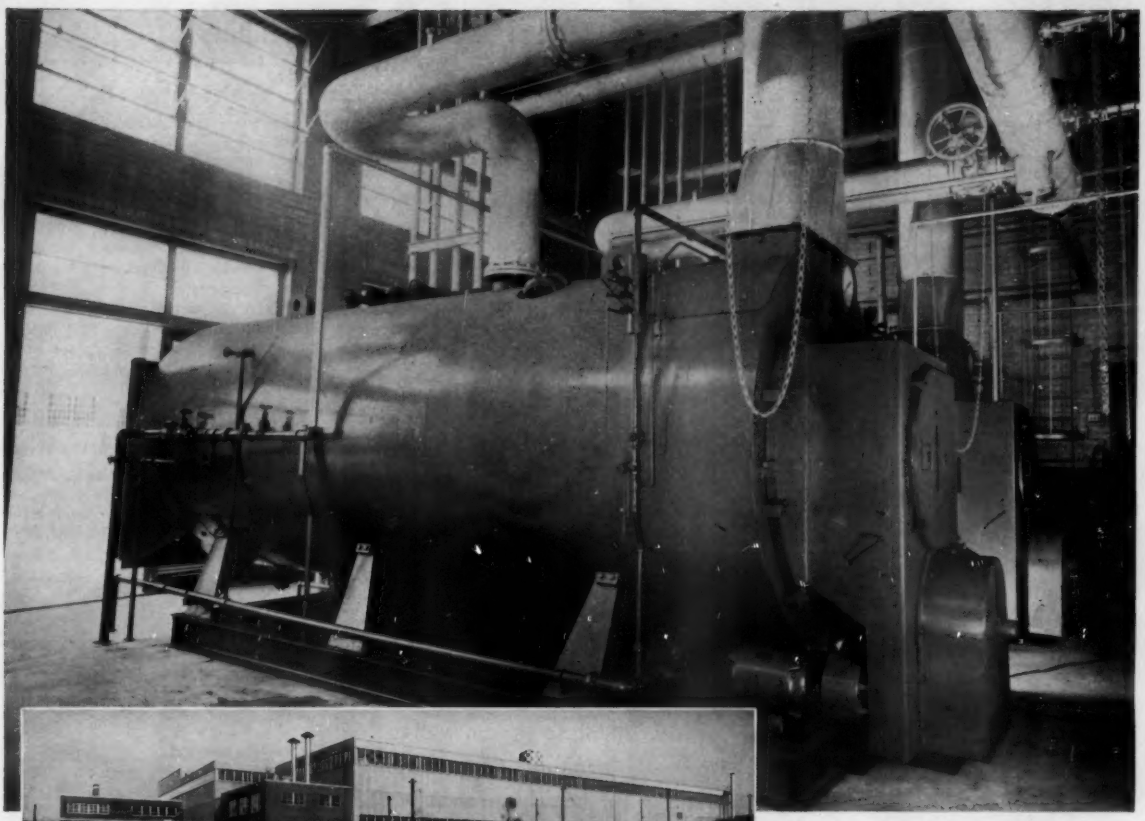
25—SMALL PARTS WASHER is heated by radiant gas

For use with commercial cleaning compounds, this compact, small parts washer incorporates manufacturer's gas-fired radiant heat system. It will be available in three sizes: 100,000, 129,000 or 158,000 Btu per hour. Tank capacity will approximate 50 gal. It is complete with an inclined trough for scum removal and an overflow drain outlet. The unit is to have safety control and automatic gas valve to supervise pilot operation and main gas supply. Of welded steel construction, with structural reinforcements, this parts washer is also claimed to offer speed and economy of operation because of the heating system utilized and the design of the heating chamber insulation. It is said that the temperature of the liquid cleaning compound will rise from 50 to 200 F in about an hour. Burdett Mfg. Co.

One of these products may be "just what you're looking for." Use the handy Reader Service Cards to ask for more information on it.

26—DRY TYPE AIR FILTERS reduce engine wear

Dry-Type Micronic Air Filters are designed to prolong the life of diesel and gasoline engines and improve their operating economy. This new type of filter is described as smaller, lighter in weight and less expensive than comparable types, and, says manufacturer, it does not present such disadvantages as oil pullover, off-level operation or difficult cleaning. The Micronic element is of resin-impregnated, convoluted cellulose to prevent excessive or insufficient oil wetting. This element is said to provide efficencies over 99 per cent with airborne particles of all sizes regardless of engine speed. It supplies cleaner air, thus reducing engine wear to abrasive particles. And due to



View of two 500 hp Continental Boilers at Tube Reducing Corporation's newest plant — Rockrite Products Div., Wallington, N. J.

100,000 sq. ft. new plant addition at Tube Reducing Corp., Wallington, N. J. This new plant is sponsored by the U. S. Navy, Bureau of Aeronautics. Consulting Engineers: Lockwood & Greene, New York, N. Y.; Heating Contractor: Frank A. McBride, Paterson, N. J.; Builder: James Stewart Corp., New York, N. Y.

CONTINENTAL BOILERS

. . . known by the company they keep

These twin 500 hp Continental Boilers are installed in a new plant that is the last word in modern efficiency — Tube Reducing Corp., Rockrite Products Division, Wallington, N. J. Besides furnishing steam for processing, they are supplying more than enough steam to heat the 100,000 sq. ft. new plant addition. They serve efficiently the men and machines that produce Rockrite Tubing — a precision product for military and industrial applications.

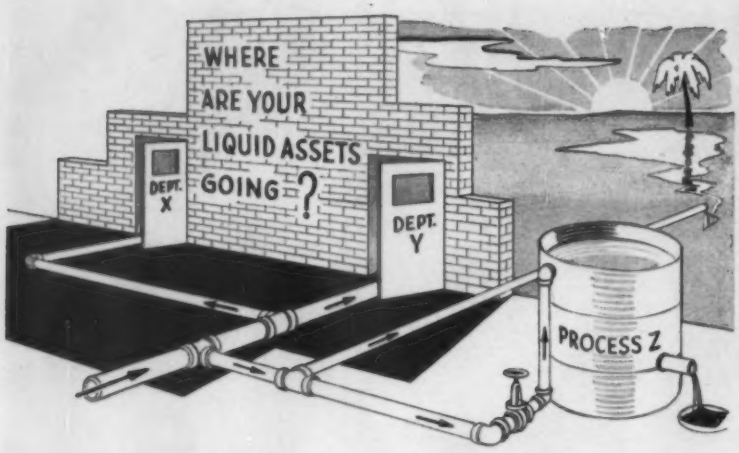
The Continental is the packaged boiler that features the "spinning gas technique". A forced draft fan delivers air to concentric rows of guide-vanes which direct the air in a spinning stream into the burner. These vanes form, in effect, a multiple-lead air-screw that provides uniform delivery of air and thorough mixing of air with fuel. The result: a high rate of heat transfer to the surrounding water-cooled furnace.

For details on Continental Boiler's "Spinning Gas Technique", send for Bulletin BE-4A.

BOILER ENGINEERING & SUPPLY COMPANY, INC.

Phoenixville, Pa.

For more facts circle 590 on Reply Card



WATER *costs* MONEY

Here's a Simple Way to *Reduce* the Cost

The costs of pumping, purifying, softening and distributing water are something to reckon with. Whether you buy from your local utility or pump your own, your plant water supply probably costs more than it should. Hoses left running, cooling water running down the drain instead of recirculating, neglected leaks, etc., quickly add up to large losses. What's worse, they deplete scarce water resources. Even the cost of sewage disposal depends upon *water* used.

Send for free technical Bulletin 566 XPE

Best way to cut these costs? Put Neptune water meters at every key point. Get water out of overhead and charge it fairly and squarely against each department or process. What stronger incentive to fix faulty equipment and stop careless habits?

Other Neptune meters also available for handling more than 150 industrial liquids. Ask today for full details . . . or a complete plant survey at no obligation.

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neptune Liquid METERS

For more facts circle 591 on Reply Card

NEW PRODUCTS

(Begins on page 134)

the vibratory characteristics of an engine, this filter is largely self-cleaning.

It is explained that because this filter offers little resistance to air flow it reduces pressure drop, keeps engine power at maximum and reduces fuel consumption. And its design features simplify replacement of many filters with the new dry type. Basic types in the new dry-type line are the manifold mounted type for up-draft; hat type for downdraft; and an outside cowl mounted type. Purolator Products, Inc.

27—SURFACING is thermosetting plastic base material

Improved Ceilcrete B is a surface treating material for low-cost protection of concrete from fluorides, hydrofluoric acid solutions. A thermosetting plastic base surfacing, Ceilcrete B can be applied to

floors, trenches, tank bases and other concrete structures. A minimum coating of ⅛ in. is claimed to provide a monolithic membrane impervious to solutions containing hydrofluoric acid. The extreme density and stonelike hardness of Ceilcrete B suggest its use for applications where resistance to abrasion, impact and constant immersion in acid solutions are important. Manufacturer points out that use of this surfacing is not confined to applications where hydrofluoric acids are used—rather it can be used in a variety of installations because only a few chemicals have a marked corrosive effect on the material. The Ceilcote Co.

28—SCRUBBER cleans both sides of metal plates

This industrial scrubbing machine is designed to clean both sides of metal sheets from all traces of surface dirt and oils. Of two models available, the longer machine removes heavier accumulations of surface dirt. Either machine processes sheets at the rate of 60 fpm. A detergent and water solution is pumped onto the plates when they enter the machine. They are then scrubbed with nylon cylindrical brushes, and rinsed and dried as they leave. Machine Div., Fuller Brush Co.

29—MICROSCOPE for measuring, is easily operated

Fifty-power magnification is claimed for the Indeco Measuring Microscope—enabling fast, on-the-spot measurement to 0.001 in. Shorter than a fountain pen,

At last!

A TRUE VINYL MASTIC!

Complete protection in a single coat—10 mils thick!

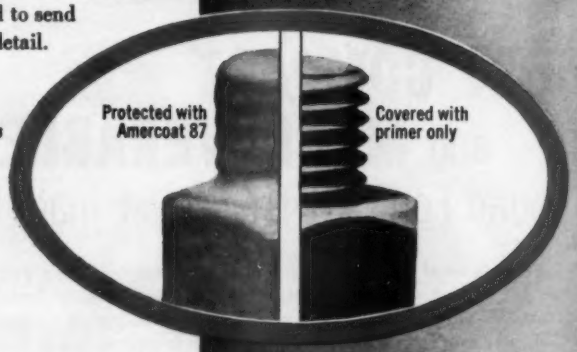
Amercoat No. 87 will cut your maintenance costs because one coat gives you the thickness and protection previously available only through the application of multiple coats.

Amercoat No. 87 is the brand new solution to an old problem, for it combines the time-tested chemical and weather resistance of a vinyl with the extra thickness that was heretofore available only in conventional mastics.

Amercoat No. 87 is easily applied with standard industrial spray equipment. Only one cross-spray coat, over a primed surface, is required for complete protection. Because **Amercoat No. 87** is a true vinyl, it is not limited to black, but is available in a variety of colors.

You can save up to 50% of your labor costs with **Amercoat's new vinyl mastic No. 87.** We will be pleased to send you a bulletin describing this new coating in detail.

Notice that the sharp bolt threads, welds and sharp corners are completely protected with one coat of Amercoat No. 87—10 mils thick!



Amercoat CORPORATION

Dept. L
4809 Firestone Blvd.,
South Gate, California

EVANSTON, ILL. • KENILWORTH, N.J. • JACKSONVILLE, FLA. • HOUSTON, TEX.

For more facts circle 592 on Reply Card

The **MOST COMPACT** and **MANEUVERABLE** 5,000 pound Fork Lift Truck ever made!

Here, in the new Model 500, are the performance features you requested . . . NEW compactness and maneuverability previously found only in much smaller units. NEW power to spare for handling up to 2½-ton loads. NEW day-long efficiency under the most severe working conditions from both gasoline and Diesel models.

Here are versatile power, capacity and performance long needed in a compact, maneuverable fork lift truck. Find out how the new Towmotor Model 500 fork lift truck can meet *your* handling requirements . . . and turn *more* of your present handling costs into profit. For complete information, call or write your local Towmotor Representative, or TOWMOTOR CORPORATION, Div. 5803, 1226 E. 152nd St., Cleveland 10, Ohio.

TOWMOTOR
THE ONE-MAN-GANG

FORK LIFT TRUCKS and TRACTORS

★ NEW Power and Compactness
★ NEW High In Maneuverability
★ NEW Handling Speed And Efficiency
★ NEW Driver Comfort
★ PLUS *All* Other TOWMOTOR Advantages

Manufactured Only By Towmotor Corporation—The Pioneer Maker Of Fork Lift Trucks

For more facts circle 593 on Reply Card

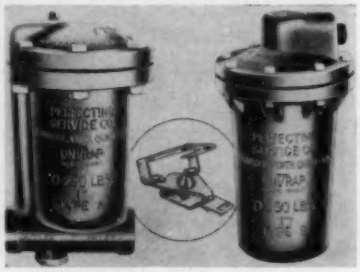
NEW PRODUCTS

(Begins on page 134)

the microscope is simple to operate. To focus, you place the microscope near the object to be measured and tilt slightly to obtain the clearest image. A small concave reflector directs and intensifies light on the field. One-tenth of an inch—maximum measurement on reticle—is divided into 100 scale markings of 0.001 in. Five ten-thousands of an inch can be estimated. Priced at less than $8.00 the microscope has a blue-gray body with decorative chrome eye-piece. International Development Co.

30—STEAM TRAP, bucket type, in two styles

The Uni-Trap employs a balanced valve principle and is designed to operate automatically through pressure ranges to 250 psi without adjustments, changing orifices, or valves. Only the pipe size is needed to specify requirements. The trap is said to be especially suited to process industries where load and pressure range vary. Greater capacities of



condensate are handled through large orifices, it is pointed out, and the dual valve permits universal application.

When the trap is filled with condensate, the bucket opens a small pilot valve, equalizing pressure on both sides of the large main valve, company explains; the pressure, then becoming balanced, allows the bucket to continue its descent and open the large capacity valve, thereby discharging the condensate rapidly. The trap is made in a standard style with bottom inlet and top outlet, and in an in-line unit that may be repaired without removing from the steam line. Internal parts are stainless steel. The trap comes in pipe sizes from ½ through 2 in. Catalog 800 gives further information. Perfecting Service Co.

31—METAL DETECTOR is for general industrial use

Universal Series Metal Detector is said to be sensitive to all magnetic metals, immediately and automatically signaling their presence, and thereby protecting machinery and product quality against tramp metal damage. The device can also detect some non-magnetics, such as manganese steel dipper teeth. Simple in design, installation and operation, detector requires no attention. You merely plug it

"Janitors can be efficiency experts, too."

IF they follow this fellow's example. He knows that with a SUPER WESTONE treated mop he can control dust and beautify his floors — just as fast as he can walk.

SUPER WESTONE actually cuts the cost of floor care.
— loosens and picks up dirt more readily.
— increases time between waxings.

SUPER WESTONE is *antiseptic*.
— arrests the growth of bacteria.
— helps prevent spread of airborne infections.

AND SUPER WESTONE is safe to use on any floor surface. No fire hazard exists, because it can be mixed with water. And no residual "build-ups" are left on floors.

A WEST representative will be glad to demonstrate. Without charge. Or send for our SUPER WESTONE folder.

OLDEST AND LARGEST COMPANY OF ITS KIND IN THE WORLD

WEST DISINFECTING Company

WEST DISINFECTING COMPANY Dept. 52
42-16 West Street, Long Island City 1, N. Y. *(Branches in principal cities)*
In Canada: 5621-23 Casgrain Ave., Montreal

☐ I'd like a free copy of your folder on controlling bacteria and dust with SUPER WESTONE.
☐ I'd like to have a WEST representative telephone me for an appointment.

Name_____

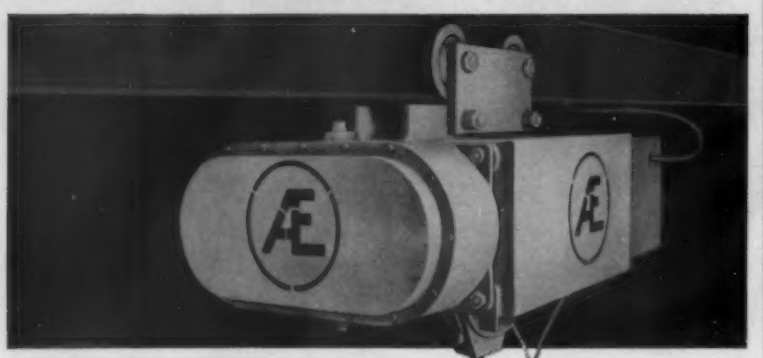
Position_____

(Tear out this coupon and mail it with your letterhead)

For more facts circle 594 on Reply Card

FOR ROCK-BOTTOM HANDLING COSTS...

STANDARD LO-HED



Truly a STANDARD hoist... ready for immediate delivery

LO HED

FOR A HOIST in the 2- and 3-ton range you'll get more for every dollar with AE's new heavy duty "Standard" Lo-Hed. This is a completely *modern* hoist; the last word in engineering and materials; quantity-produced; packed with extras at no extra cost.

"Standard" Lo-Hed's balanced design is tops for crane, monorail and stationary service... unmatched for simplicity and maintenance ease. Welded steel chassis combines rigidity and light weight. Straight line spur gear drive abolishes worm-wheels, extended shafts and split gear combinations. Lower limit safety switch is standard... no extra charge!

For economical materials handling, write for full information on the "Standard" Lo-Hed... or on the Customized Lo-Hed if you have special requirements. American Engineering Co., 2503 Aramingo Ave., Philadelphia 25, Pa.

FAMOUS CUSTOMIZED LO-HED

For lifts of more than 20 feet... for low headroom... for loads from ¼ ton to 12 tons... a Customized Lo-Hed Hoist will bring you the same speed, efficiency and economy that have cut handling costs in plants from coast to coast.

AMERICAN ENGINEERING

COMPANY

Philadelphia 25, Penna.

Affiliated Engineering Corporations, Ltd., Montreal 16, P. Q.
Bawden Industries Ltd., Toronto 3, Ont.

AE Products are: Marine Deck Auxiliaries, Hele-Shaw and Hydromite Fluid Power, Lo-Hed Hoists, Lo-Hed Car Pullers, Taylor and Perfect Spread Stokers.

For more facts circle 595 on Reply Card

NEW PRODUCTS

(Begins on page 134)

into any single phase outlet, place the search coil around conveyor belt, and turn on the switch. Intensity can be adjusted to overlook non-magnetic belt lacings. The small compact control cabinet weighs 24 lb; and contains standard type tubes. Detectors are available for detection of minute particles of non-magnetic metals also. Dings Electronics, Inc.

32—SILVER BRAZING ALLOYS and flux for production

Aircosil Alloys are available in rod, wire, sheet, rings and gasket forms, as well as special shapes. Silver brazing flux in the new Aircosil line is in paste form. According to company, it will not freeze, crystallize or separate, and the residue rinses off in hot water. Aircosil Alloys and Flux provide joints that are exceptionally strong, it is noted, and the penetrating action is fast and with a small neat fillet left outside the joint. Its bonds are claimed liquid- and gas-tight under heavy pressures. High thermal and electrical conductivity plus high corrosion resistance are among other advantages cited. Aircosil joins most ferrous, nonferrous and dissimilar metals and alloys that have melting points above its free-flowing temperatures. Aircosil is announced as the first silver brazing alloy to be sold by avoirdupois (16 oz per pound) weight, rather than troy ounces. Air Aircosil brazing booklet gives complete details. Air Reduction Sales Co.

33—PRESSED WOOD with smooth grey undercoating

Primecoat Presdwood has a smooth, even undercoating in a neutral grey color, which is said to be an ideal base for any color or type of top coat—light or dark paint, enamel or lacquer. Primecote Presdwood comes 4 ft wide and in 8-ft and 12-ft lengths and in the following grades and thicknesses: ⅛ in. standard and tempered; 3/16 in. tempered; and ¼ in. tempered and panelwood. Applications include exterior soffits, interior partitions, ceilings, walls. Masonite Corp.

34—PORTABLE PUMPS for use in sprinkler irrigation

Type GME Centrifugal Pumps, offered for use by plants having extensive grounds to sprinkle, are available separately or incorporated in self-contained gasoline or diesel engine powered pumping units. Designed for use in modern portable sprinkler irrigation systems, the pumps and pumping units come in four sizes to deliver from 200 to over 1800 gpm, operating against heads to 200 ft. The pumps may be used where the water source is a pond, lake, stream, river, pit, sump or reservoir, or for booster service where additional pressure is needed.

The pumps have bronze impellers enclosed in heavy-duty cast iron shells. Impellers are keyed to large steel shafts,

A GOOD MAN TO KNOW FOR INDUSTRIAL LUBRICATION

No service is better than the men behind it. That's why Atlantic lubrication consultants, such as the man you see in the illustration, are experienced men with years of on-the-job knowledge of heavy industrial lubrication requirements.

These men are also representative of the men behind the service you can expect from Atlantic. Atlantic is made up of many specialists — men skilled in research, production, transportation and marketing of petroleum products from lubricants and gasolines to petrochemicals.

Behind their skills are 85 years of developing successful products for the use of our customers. Atlantic has pioneered in many historic firsts in the petroleum industry. To judge for yourself the value of Atlantic service, write, wire or phone the Atlantic office nearest you for full information on Atlantic lubricants for heavy industrial installation. The Atlantic Refining Company, Dept. M-3, 260 South Broad Street, Philadelphia 1, Pa.

ATLANTIC

LUBRICANTS · WAXES
PROCESS PRODUCTS

PROVIDENCE, R. I.
430 Hospital Trust Bldg.

SYRACUSE, N. Y.
Salina and Genesee Sts.

READING, PA.
First and Penn Aves.

PITTSBURGH, PA.
Chamber of Commerce Bldg.

For more facts circle 596 on Reply Card

Here's how to get

QUICK STARTS and POSITIVE STOPS

New HILLS-McCANNA *AIR ACTUATED* Metering and Proportioning Pumps

Have *you* a problem involving continuous metering of small volume flows? The new Hills-McCanna air actuated pumps can solve these problems in many cases where conventional pumps are not satisfactory . . . because they have an air cylinder drive. With them you can start fast and accurately and stop immediately — at high or low speeds.

In the photo above a "UP" type pump is used as a "pickle pump" — adding just the right amount of brine to pickle jars. Other uses range from the injection of petroleum additives to putting ink in fountain pens. In all these services, the "UP" is dependable and accurate and may be used with a wide variety of controls.

Hills-McCanna air actuated pumps are available in capacities of 0.1 gph. to 200 gph., with adjustable stroke lengths for positive volume control . . . all are built to the same high engineering standards as Hills-McCanna electrically driven pumps.

Write for Bulletin UP-55 — HILLS-McCANNA CO., 2450 W. Nelson St., Chicago 18, Illinois.

DESIGN DETAILS

- External, interchangeable check valves
- Interchangeable barrel and housing
- Unitized construction, common base
- Positive stroke adjustment
- Trouble-free operation

HILLS-McCANNA

metering and proportioning pumps

Also Manufacturers of:
SAUNDERS TYPE DIAPHRAGM VALVES
FORCE FEED LUBRICATORS • MAGNESIUM SAND ALLOY CASTINGS
For more facts circle 597 on Reply Card

NEW PRODUCTS

(Begins on page 134)

supported in ball bearings. When supplied separately, the pumps are furnished with coupling for bolting to the flywheel of the power unit and with bearing bracket to be bolted to the flywheel housing. Complete pumping units are available with several makes of engines; may be skid-based or trailer mounted. Aurora Pump Co., Div., The New York Air Brake Co.

35—PNEUMATIC RELAYS control air volume, pressure

Representative functions performed by this line of air relays include air volume amplifying; pressure reversing, retarding, advancing and averaging; differential controlling, and minimum pressure controlling. One interesting device allows the highest of two varying air supply pressures to determine the control pressure. Another acts as a check valve, permitting air flow in one direction only. An electropneumatic valve allows air passage only when the solenoid is energized.

Control in most cases is gradual, although snap action is available in some devices. Direct or reverse action are standard operations on many relays. The general design of the relays is described as compact, simple and rugged. A feature common to most is ⅛-in. NPT connections for air pressures to about 25 psi. Detailed information is in Bulletin 359. The Powers Regulator Co.

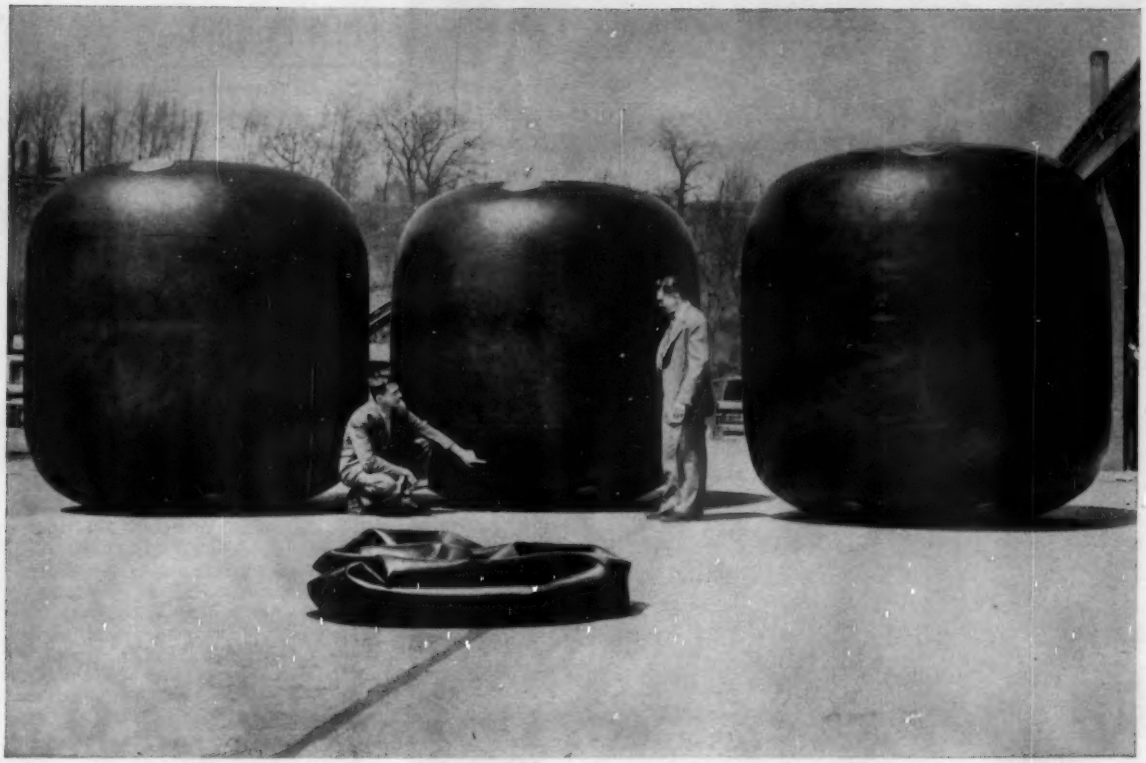
36—FIRE HOSE is lighter in weight and more flexible

Flexrite Fire Hose employs Dacron, a chemically produced polyester fiber, as filler cords in both inner and outer jackets to give maximum strength. These

filler cords, company reports, result in a lighter, more flexible piece of fire hose with less bulk. Flexrite is supplied in 1½ in. ID and 2½ in. ID double jacket construction with 400 lb test pressure. Advantages claimed for the hose include ability to rack and handle easier in actual use, and ability to save space by folding tighter. Hamilton Rubber Mfg. Corp.

37—PALLET STACKER offered with battery power

Originally designed to plug into an electrical outlet, this pallet stacker is now available with a 12-v battery operated lifting motor and automatic built-in



Neoprene protects collapsible shipping "drums" against chemicals, abrasion, weathering

NEWEST METHOD for shipping powdery or granular materials is flexible "drums" which pack flat for return shipment. They consist of multiple layers of rubber and fabric, reinforced with cables. And for versatility and extra-long service, the drums have an inner lining and outer covering of neoprene—Du Pont's chemical rubber.

These sturdy drums offer reduced handling costs to shippers, inexpensive bulk shipment and storage to customers. And neoprene adds still other advantages. The durable neoprene lining resists chemicals and oils . . . permits safe shipment of a wide range of chemically active materials. And the rugged neoprene outer coating stands up to weathering, sunlight and abrasion encountered in transit.

In this new application, as in industrial rubber goods of all types, neoprene extends service life, cuts maintenance costs. Give your supplier a call. He'll be glad to show you the neoprene products he sells.

SPECIFY NEOPRENE IN THESE PRODUCTS:

NEOPRENE

The Rubber Made by Du Pont Since 1932

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REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING
...THROUGH CHEMISTRY

MAIL THIS COUPON TODAY

FREE! THE NEOPRENE NOTEBOOK—Every issue describes new products, unusual applications of neoprene . . . shows how neoprene cuts maintenance costs. Clip and mail this coupon to get on the mailing list. E. I. du Pont de Nemours & Co. (Inc.), Rubber Chemicals Division PL-3, Wilmington 98, Del.

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*City*_____ *State*_____

For more facts circle 598 on Reply Card

the best circuit breaker safety switch *costs no more*

You would expect to pay *much* more for this Heinemann 100 Ampere Safety Switch.

It's easier to install, more convenient to use. After trouble is cleared from the line, a flip of the handle restores service instantly. There's no hunting for fuses . . . no waiting to reset. Heinemann circuit breakers operate hydraulic-magnetically . . . permit safe use of the full capacity of your wiring at any temperature, without de-rating or the extra cost of larger switches. Inverse time delay allows necessary starting currents, prevents false-alarm tripping.

It's less than half the size and half the weight of comparably rated fused switches.

Yet, with all this extra value, the Heinemann Safety Switch costs no more. For descriptive literature, request Bulletin 1411.

ORDER NOW

For 120/240 volts AC, 3 wire; 120 volts AC 2 wire with insulated groundable neutral.

Cat. No. H-9002-70 enclosure with 70 amp. circuit breakers.

Cat. No. H-9002-100 enclosure with 100 amp. circuit breakers.

HEINEMANN ELECTRIC COMPANY

128 Plum Street, Trenton 2, N. J.

Circuit Breakers

For more facts circle 599 on Reply Card

NEW PRODUCTS

(Begins on page 134)

charger. Two 6-v 125-amp-hr batteries are wired in series to provide the 12-v current. Batteries can be charged during off-duty use to keep the unit ready for a full 8-hr shift operation, it is pointed out. Designed to lift and stack 2000-lb loads, this stacker has adjustable base forks that will straddle popular size pallets. Adjustable-width lifting forks can be had in lengths of 36 or 40 in.

The stacker is positioned manually and a fifth wheel steering arrangement provides maneuverability. It is claimed to be especially useful in temporary storage areas, outside warehouses and areas where electric service is not available. The Raymond Corp.

38—SAFETY HATS provide increased head protection

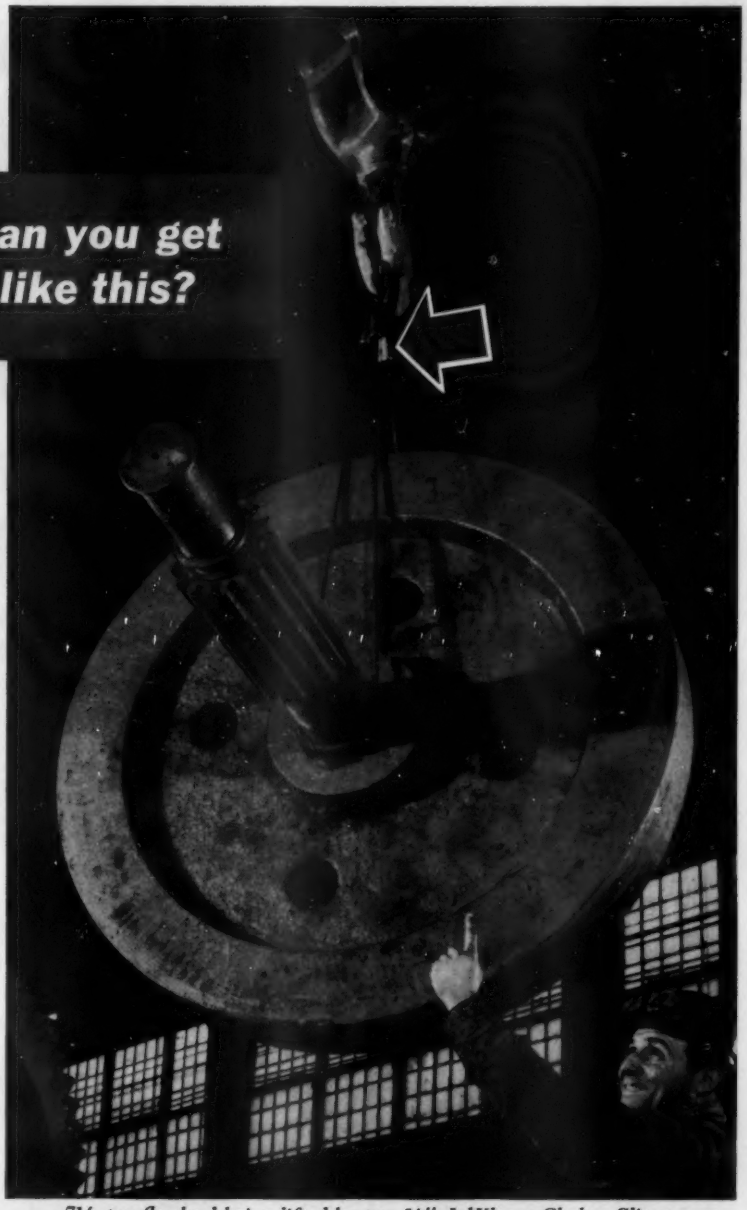
Super-Tough Safety Hats and Caps feature the geodetic suspension and pneumatic headband cushion developed by Cornell Aeronautical Laboratory, Inc. According to company, research has shown that the harness or suspension, usually looked upon only as a means of holding the hat on the head, can transmit

shock from the shell of the hat to the brain—even when the shell has not been penetrated, the brain may sustain injury. It is explained that the geodetic or "great circle" crown suspension incorporated in these hats and caps distributes the force of a blow evenly over a large area of the head to minimize effects of a blow.

The pneumatic headband cushion consists of 12 vinyl plastic air cells located between the sweat band and the shell of the hat. This serves to resist and distribute the impact of lateral blows on the perimeter of the head. The pneumatic feature also affords comfortable cushion-fit on the head. Size is adjusted by regulating the amount of air in the pneumatic structure by a self-sealing valve. The hat shell is molded of Fiberglas reinforced resins. Both hats and caps come in yellow, red, green, gray and white. Willson Products, Inc.

39—TEMPERATURE UNIT may be mounted directly

Type T Temperature Regulators may be mounted directly on heat exchangers, instant water heaters, etc., having inlet



7½ ton flywheel being lifted by two ⅜" JalKlamp Choker Slings.

More strength at lower cost— with JalKlamp

Here's the newest way to cut your materials handling costs.

J&L can furnish safer, stronger wire rope slings and terminals *at lower cost* thanks to JalKlamp, the new sleeve for wire rope splicing, exclusive with J&L.

The reason: non-corrosive JalKlamps are made from a special alloy. When hydraulically pressed around the rope, this alloy flows into the spaces between the wires and strands . . . produces a neat, permanent, watertight splice that's stronger than any tucked splice. And, because they're machine made, JalKlamp splices cost less.

JalKlamp slings and terminals are available for all standard wire rope constructions and in diameters ranging from ⅛" through 2", with SpringKore, Plasti-Kore, Fiber Core, and Independent Wire Rope Centers.

Specify JalKlamp slings and terminals and get these features:

1. High Strength
2. Economy
3. Non-Corrosive
4. Water Tight
5. Permanent
6. Neat, Safe — no jagged ends

Jones & Laughlin Steel Corporation
503 Gateway Center,
Pittsburgh 30, Pa.

☐ Please send me a free copy of your JalKlamp booklet.

Name_____

Company_____

Address_____

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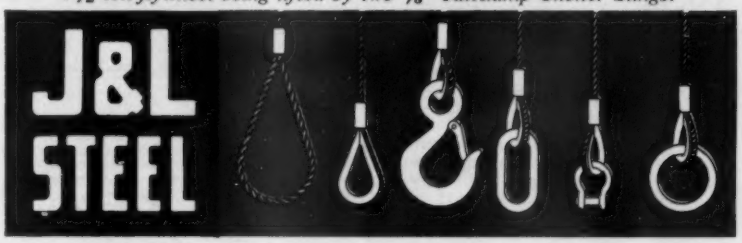


Jones & Laughlin
STEEL CORPORATION — *Pittsburgh*

For more facts circle 600 on Reply Card

Now! A packaged conveyor!

• R-W "460" Conveyor carries plastic signs through painting and drying operations of Timely Products Mfg. Co., plant at Des Moines, Iowa.

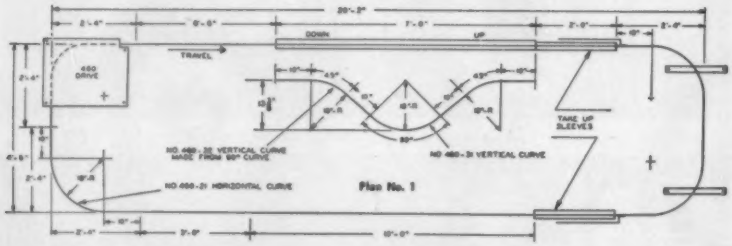
NEW R-W "460" Continuous Power Chain Conveyor requires no special installation engineering!

Richards-Wilcox' new "460" overhead conveyor can be installed without special engineering by your own plant personnel, quickly and easily, to meet *your* specific needs.

Completely packaged and shipped from stock, it offers economical and versatile light-load handling because of its lower load limits, flexibility, and easy installation.

R-W "460" is unequaled for jobs where the use of heavier conveyors is impractical. It is particularly recommended as a supplementary unit on production lines, and to help simplify and speed production where drying ovens, washers, paint sprayers, de-greasers and similar operations are involved.

R-W "460" is available up to 200-ft. maximum lengths *only*, with capacities of 8½ lbs. on 6-inch centers or 17 lbs. per lineal foot, and 200 lbs. draw-bar pull.



Plan No. 1

Diagram shows one of many different layouts possible with R-W "460" basic package. Up to maximum over-all length of 200 feet, variations are almost unlimited.

"460" Conveyors are shipped completely packaged, in convenient, easily-handled units, from stock throughout the U. S. Packages to fill any requirement up to 200-foot maximum length are immediately available from stock. For complete information and descriptive catalog, contact:

Richards-Wilcox Mfg. Co.
MATERIALS HANDLING DIVISION
Branches in Principal Cities

75 YEARS of QUALITY and SERVICE for RICHARDS-WILCOX AURORA, ILLINOIS 1880 1955

460 W. THIRD STREET, AURORA, ILL. SLIDING DOOR HANGERS & TRACK • FIRE DOORS & FIXTURES • GARAGE DOORS & EQUIPMENT • INDUSTRIAL CONVEYORS & CRANES • SCHOOL WARDROBES & PARTITIONS

For more facts circle 601 on Reply Card

NEW PRODUCTS

(Begins on page 134)

connections on top—permitting simplified piping and installation. The regulator has renewable wearing parts of stainless steel or bronze. An over-run device for protection of the thermal element in the event temperature at the bulb exceeds the range of the regulator is another feature announced. A two-ply bellows is used in the thermal unit for added power and longer life. Body is bronze or semi-steel. It is available with screwed connections in sizes from ¼ to 2 in. and with flanged connections in sizes from 2 to 8 in. All ¼ to 4 in. sizes are spring loaded and all sizes from 6 to 8 in. are weight loaded. O. C. Keckley Co.

40—VARIABLE SPEED DRIVE has operating advantages

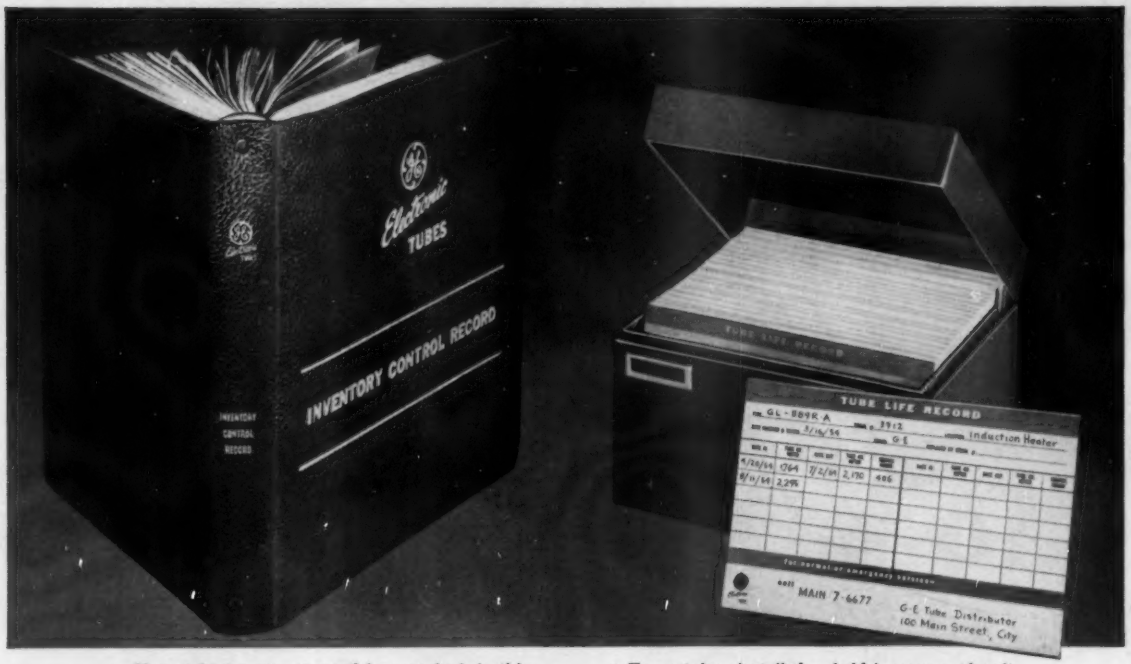
The Dynaspede Coupling is a stationary field, liquid cooled, eddy-current adjustable speed power transmission device. Driven by a constant or variable speed power source, the Dynaspede Coupling is designed to deliver torque or speed to suit specific processing requirements. The absence of rotating electrical components is claimed to result in reduced maintenance and in adaptability to hazardous, moist, dirty and other adverse locations. Also, the liquid cooling utilized is said to provide an effective heat transfer medium, permitting wide speed ranges at constant or reduced torque and, under certain conditions, constant horsepower. Bulletin SF-1 furnishes more details. Dynamatic Div., Eaton Mfg. Co.

It's easy to obtain product data with the postage-free Reader Service Cards provided on pages 199-200. Use them for information on advertised products, too. Just circle the key number appearing at bottom of the ad.

41—FIRE REPELLENT FABRIC stands flames and heat

Fyre-Armor is a fire repellent fabric so constructed as to offer protection against raging flames and high radiant heat temperatures up to 2500 F. This lightweight fabric made into suitings and protective equipment has been devised by a process in which flame resistant fabrics are fused to metallic layers and then topped by treated aluminum foil, thus providing surfaces with great reflective powers. Fyre-Armor is expected to be of value wherever men are hampered in the performance of their jobs in the face of high heat.

Suits of Fyre-Armor come in 10 models, weigh only as much as ordinary suits — 5 to 10 lb — says manufacturer, and the temperature inside these suits doesn't rise above normal body tempera-



• Your tube inventory record by months is in this binder—with tube prices, ratings, and other essential facts. Binder is blue leatherette, gold-lettered.

• Every tube—installed or held in reserve—has its own life card, with up-to-the-minute data on performance. Cards are filed in a substantial metal box.

G.E.'S MODERN TUBE INVENTORY CONTROL SYSTEM CUTS YOUR TUBE COSTS...REDUCES MACHINE DOWNTIME!

SEE your G-E tube distributor for details on this scientific, complete system for recording and controlling electronic-tube performance in your plant!

By having at your fingertips the facts on every tube's life record—by knowing tube costs per hour, as well as by unit—it is possible to budget and control replacement expense economically.

Still greater savings will come from full-time machine operation. For your critical tube sockets, G.E.'s inventory control system enables you to have a constant minimum of spares on hand to serve the emergency needs of your electronic heaters, resistance welders, and other tube-controlled equipment. Downtime is greatly reduced.

Your General Electric tube distributor will be glad to help install this industry-proved, easy-to-operate system in your plant. Phone him today! *Tube Department, General Electric Company, Schenectady 5, New York.*

Progress Is Our Most Important Product

GENERAL ELECTRIC

161-182

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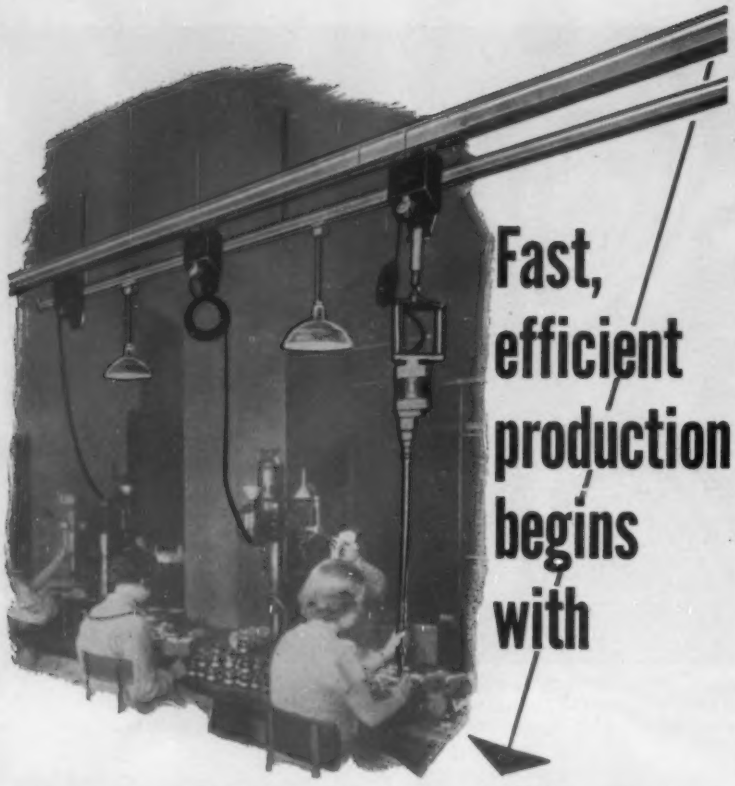

Fast, efficient production begins with

ELECTRIC FEEDRAIL®

That's because FEEDRAIL Trolley Busways over your production, assembly and test lines . . .

- provide mobile outlets for electrical machines and portable tools where they're wanted.
- eliminate long, dragging cables that endanger personnel and hamper their work.
- keep electrification and tools off floor and benches . . . away from the danger zone.
- enable quick tool changes without cutting off power.

Safe, smooth-flowing, time-saving production is the result — *a result you can get in your plant.* FEEDRAIL Trolley Busways are surprisingly easy to install in operating plants as well as new ones. And they're just as readily modified or moved to meet changing production requirements.

When you install FEEDRAIL Trolley Busways you're sure of maximum safety, adaptability and reliability in electrical power distribution.

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SOLD BY MORE THAN 1,000 ELECTRICAL DISTRIBUTORS FROM COAST TO COAST

54-2

Never Becomes Obsolete

FEEDRAIL CORPORATION

Subsidiary of Russell & Stoll Company, Inc.

125 BARCLAY STREET • NEW YORK 7, N. Y.

SPECIALLY QUALIFIED REPRESENTATIVES IN PRINCIPAL CITIES

For more facts circle 603 on Reply Card

NEW PRODUCTS

(Begins on page 134)

ture. No special underclothing or extra protective equipment need be used in conjunction with them. The fabric can be sewn into other garments and protective covers. Far-Ex Corp.

42—UNIT HEATER is a self-contained, oil-fired unit

This 140,000 Btu oil-fired, suspended type unit heater is announced as a self-contained, factory assembled unit, requiring only a vent, electric outlet and tap to fuel supply. It is equipped with a gun type burner and thermostat controls. The fan provides a throw of 50 ft and can be used in summer for ventilation. Heater uses low cost commercial standard grade fuel oil. One advantage claimed for the heater is high fuel burning efficiency which, in addition to reducing costs, eliminates smoke. It is designed for both permanent heating and temporary heating. Several units may be hooked on one fuel line. Interstate Heater Mfg. Co.

43—HEAT EXCHANGER is an improved bayonet type

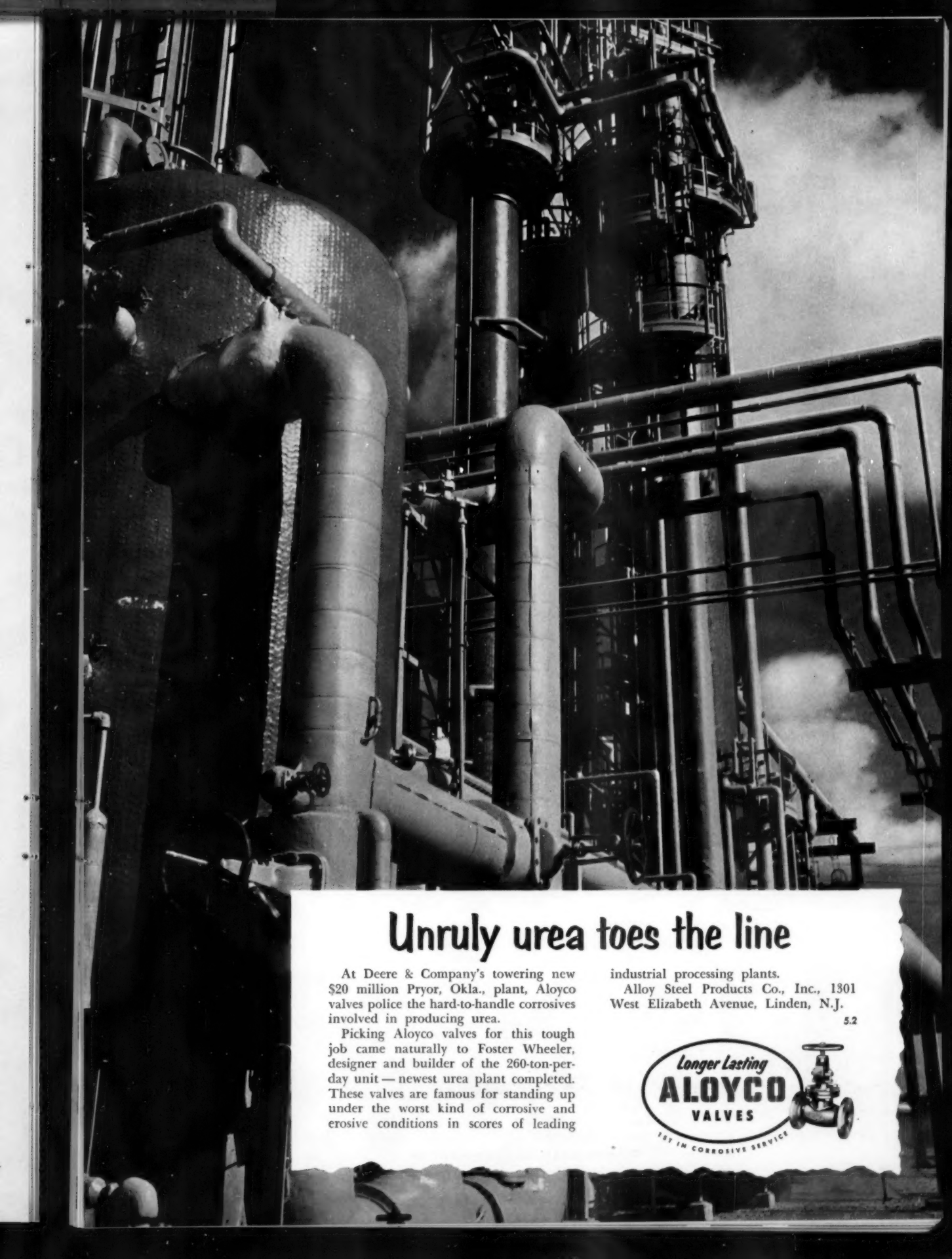
In the improved Camac Karbate Bayonet Heat Exchanger heavy flanges have been eliminated, minimizing area required for installation. Condensate is removed by a small internal steel pipe riser and the

joint between header and Karbate tube is fiber glass reinforced for greater strength. According to manufacturer, these bayonets have an excellent rate of heat transfer, hence units have large capacity in relation to size. They can be used for either cooling or heating or alternately for both since, it is pointed out, Karbate is not affected by thermal shock. Units can be provided in any length up to 6 ft, and it is stated that the improved design permits lower prices. Data sheets are available. Carl Buck & Associates.

55—BLACK PAINT resists acids and alkalies, too

An improved type of Chem-Rem is said to have greater covering capacity than the former type, to make possible the one-coat coverage. Greater water repellence and added lustre, through the inclusion of silicone in the paint formula, are other features announced. Chem-Rem is suggested for both interior and exterior use on metal, masonry or wood. It is claimed to withstand attacks of acetic and hydrochloric acids, dilute sul-

For more facts circle 604 on Reply Card ——→



Unruly urea toes the line

At Deere & Company's towering new $20 million Pryor, Okla., plant, Aloyco valves police the hard-to-handle corrosives involved in producing urea.

Picking Aloyco valves for this tough job came naturally to Foster Wheeler, designer and builder of the 260-ton-per-day unit — newest urea plant completed. These valves are famous for standing up under the worst kind of corrosive and erosive conditions in scores of leading industrial processing plants.

Alloy Steel Products Co., Inc., 1301 West Elizabeth Avenue, Linden, N.J.

5.2

Longer Lasting
ALOYCO
VALVES
TRY IN CORROSIVE SERVICE

Garlock 150
High Pressure
Steam Packing

Garlock 234
ROTOPAC Rotary
Pump Packing

Garlock 117
Valve Stem
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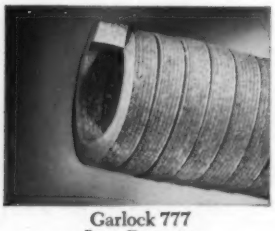
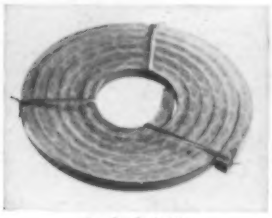
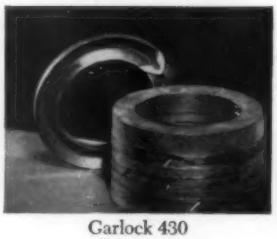


Garlock 777
Low Pressure
Packing

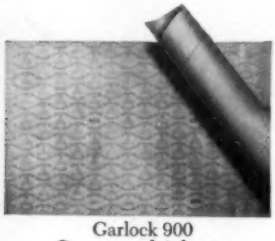


Garlock 262
Special Hydraulic
Packing

Garlock 730
LATTICE BRAID*
Asbestos Packing



Garlock 430
CHEVRON*
Hydraulic Packing



Garlock 900
Compressed Asbestos
Sheet Packing

ONLY GARLOCK MAKES AND SELLS ALL THESE PACKINGS AND GASKETS

Look for the familiar Garlock trademark. It is your guarantee of dependable, proven, high-quality products. **AND**—your Garlock representative is a packing specialist, selling only Garlock products. Call him in for all your packing requirements.

THE GARLOCK PACKING COMPANY, PALMYRA, NEW YORK

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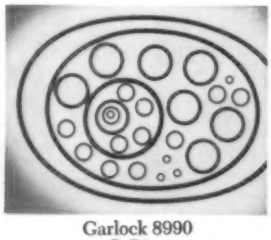
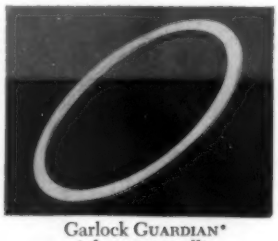
Garlock 122
Red Rubber
Gaskets



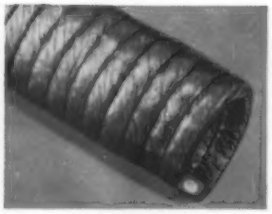
Garlock 8990
O-Ring
Packings



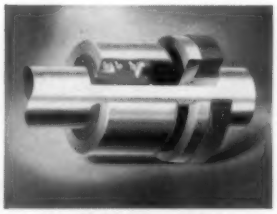
Garlock GUARDIAN*
Asbestos-metallic
Gasket

Garlock BITAN*
Leather Cups, Packings
and Gaskets

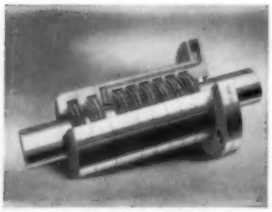
Garlock "Teflon"
Packings and
Gaskets



Garlock 631
Twisted Lead
Foil Packing



Garlock MECHANIPAK
Package Seal for
Rotary Shafts



Garlock 875
Floating Metal
Packing

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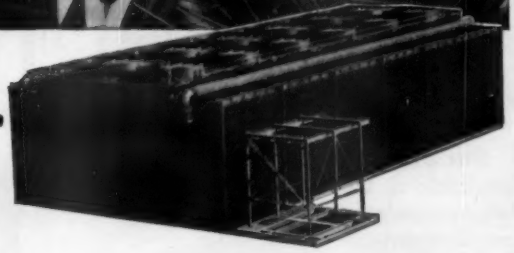
He tests his purchases...

Do you?



Cooling tower owners, too, turn up some surprising test results — as you will discover when you follow the simplified testing procedure described in a new Marley technical publication, "Test Your Tower".

You may be astounded, for example, with the difference between your tower's actual performance and the performance "guaranteed" by the manufacturer. Or, if you have a tower that was purchased with plant expansion in mind, a test now may reveal that the future performance you are counting on is purely theoretical — that it won't be there when you need it.

But whatever your situation, it will pay you to test. And "Test Your Tower" makes testing simpler, more direct, and more accurate than ever before. Get your free copy right away — by mailing the coupon below or calling the Marley representative in any of fifty major cities.

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The Marley Company

Kansas City, Missouri

Technical Services Dept.
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Please send me a copy of your new brochure, "Test Your Tower."

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you save engineering time

with complete hanger assemblies

To save many hours of engineering time and to speed up your specifications, use Blaw-Knox overhead roller assemblies, rigid hanger assemblies, functional spring hangers with the patented *internal swivel action*, constant support spring hangers and vibration eliminators.

Each is a complete unit, designed for a specific purpose. Constructed to comply with the "code for pressure piping." Available in types and sizes to meet varying conditions.

And each is ready to install, which eliminates expensive cutting, threading and assembling in the field.

Our experienced engineers are available to both design and make recommendations for your hanger requirements.

Write for your copy of Bulletin No. 54 to get complete information

BLAW-KNOX COMPANY
Power Piping and Sprinkler Division
Pittsburgh 33, Pennsylvania

BLAW-KNOX **PIPE HANGERS**

Complete line of functional spring hangers • constant support spring hangers • rigid hanger assemblies • overhead roller assemblies • supports • vibration eliminators . . . plus complete prefabricated piping systems for all pressures and temperatures

For more facts circle 607 on Reply Card

NEW PRODUCTS

(Begins on page 134)

furic acids or mixtures of these, and to protect against action of bleaching solutions, dilute caustic soda, ammonia and other alkalines. Manufacturer recommends it for locations where smoke and chemical fumes are present.

Chem-Rem can be applied by brush, spray or dip. It dries to the touch in 3 hr, sets in 10 hr. It is intended for use as a finish coat—will bleed through other paints. It is claimed impervious to moisture, unaffected by temperature changes and highly resistant to oil or oil fumes. Speco, Inc.

56—CONDENSER CLEANER is air or water operated

The Blo-Gun—a condenser cleaner which may be air or water operated—is designed for removing soft deposits, such as mud, algae, and similar accumulations from condensers in steam power plants, and in refrigeration, air-conditioning and process industries. The gun makes use

of the plug shooting method. Light weight, minimum number of parts, long service and rapid functioning are announced as its chief features. It weighs only 2 lb, and has an aluminum housing with a removable bronze nozzle and rubber spray shield.

The gun is available with either a corded-rubber plug or nylon spiral brush, whose projectiles are furnished with outside diameters between ½ and 1 in. Both plugs and brushes may be used repeatedly. After plug or brush is placed in tube, the Blo-Gun nozzle is inserted and by a continued forward movement, compressed air or water is released, propelling the accessory forward through the tube. Thomas C. Wilson, Inc.

57—INDUSTRIAL FANS, cast iron, for rugged service

For rugged industrial applications, these cast iron fans have been redesigned to provide greater versatility and efficiency —handling wood shavings, chips, granular material, textile fibers, asbestos, rags, powders, dust, gases and fumes. For specific applications, any of four different wheels of three drive arrangements may be selected. Protective accessories and coatings are available for high temperature and extreme abrasion installations.

This 500 series of fans features a wide

Speed fastening jobs in your plant with the REMINGTON STUD DRIVER

Anchors steel or wood fixtures to concrete or steel in seconds!

Maintenance operations often require anchoring of machinery or wall partition sections—and that kind of job's made to order for the Remington Stud Driver. One man can set up to 5 studs a minute with this cartridge-powered tool, cutting downtime on equipment to a minimum. Speed like this means big savings in labor, more time to tackle the *tough* jobs.

With no wires or cables to worry about, a maintenance man can use the Stud Driver practically anywhere, indoors and out. Its light weight (6 lbs.) makes overhead work easy . . . its compact size permits use in cramped quarters. And what a range of uses! Anchoring conduit clips, structural channel or wood plates is all in the day's work for the Remington Stud Driver. Find out, by sending in the coupon, how this cartridge-powered tool can save time and money in your plant.

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Remington DUPONT

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A. *You bet! Our distributors carry a complete line of studs, including the threaded type. We'll be glad to send you an illustrated booklet on Remington Studs.*

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Please send me my free copy of the new booklet showing how I can cut my fastening costs.

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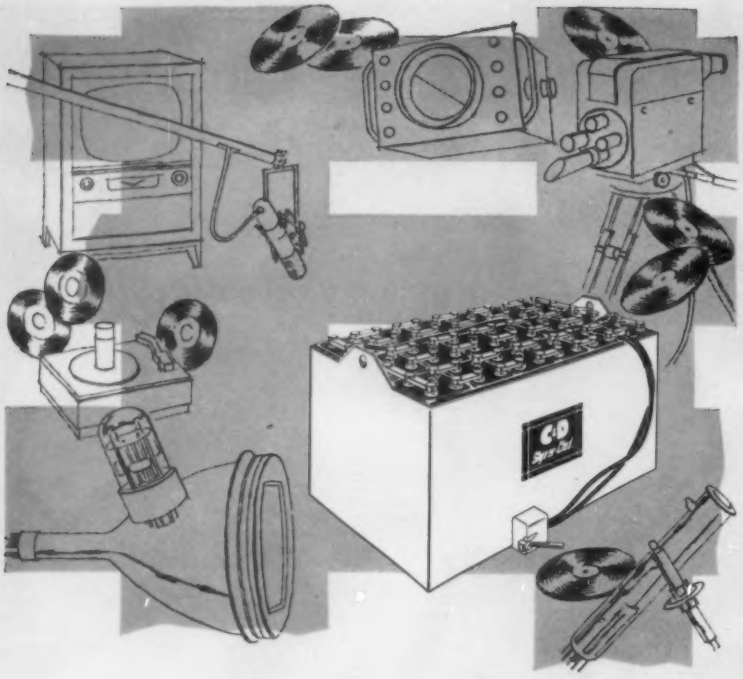

at RCA—C&D Industrial Batteries for EXTRA work

RCA, pioneer and leader in the development of the phonograph, radio and television, has brought pleasure and entertainment to countless millions all over the world. Naturally, RCA uses thousands of tons of materials of all kinds to make its famous products. To help solve its materials handling problems, RCA uses C&D Slyver-Clad* batteries as one of its major sources of power for its industrial trucks employed in daily operations. For RCA, like hundreds of other important companies, has found it pays to power with C&D Slyver-Clad batteries.

C&D Slyver-Clad batteries are approved as standard equipment by all electric truck manufacturers. For further information, write for Catalog.

*T. M. Reg.

C&D

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Sales and Service Offices in Principal Cities from Coast to Coast

Export Division: 1015 Schaff Building, Philadelphia 2, Pa.

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NEW PRODUCTS

(Begins on page 134)

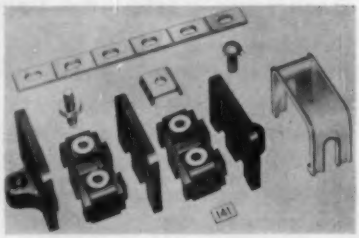
range of sizes with wheel diameters from 8¼ to 34½ in. and inlet pipe sizes from 4½ to 18 in. Air volumes range from 150 to 12,000 cu ft per min. Fan housings are convertible to all normal discharge directions and are also reversible. Special fabricated wheels can be made from Everdur or stainless steel; wheels for wool fibers are available in cast iron or bronze. Sturtevant Div., Westinghouse Electric Corp.

58—PLASTER RELEASE now comes in spray cans

Previously available only in quart containers, Master Plaster Release is now packaged in easy-to-use spray cans priced around $1.25. To apply it you press the button and direct the spray to the proper surface. Master Plaster Release is a liquid for releasing plaster casts from wood, metal, or plaster patterns and core-boxes. Exact reproductions are obtained through its use, says manufacturer, because no fillets are formed by the release and there is no buildup to affect accuracies. It is said to contain no ingredients which tend to soften plaster and is designed for use in conjunction with gypsum cements, too. Kindt-Collins Co.

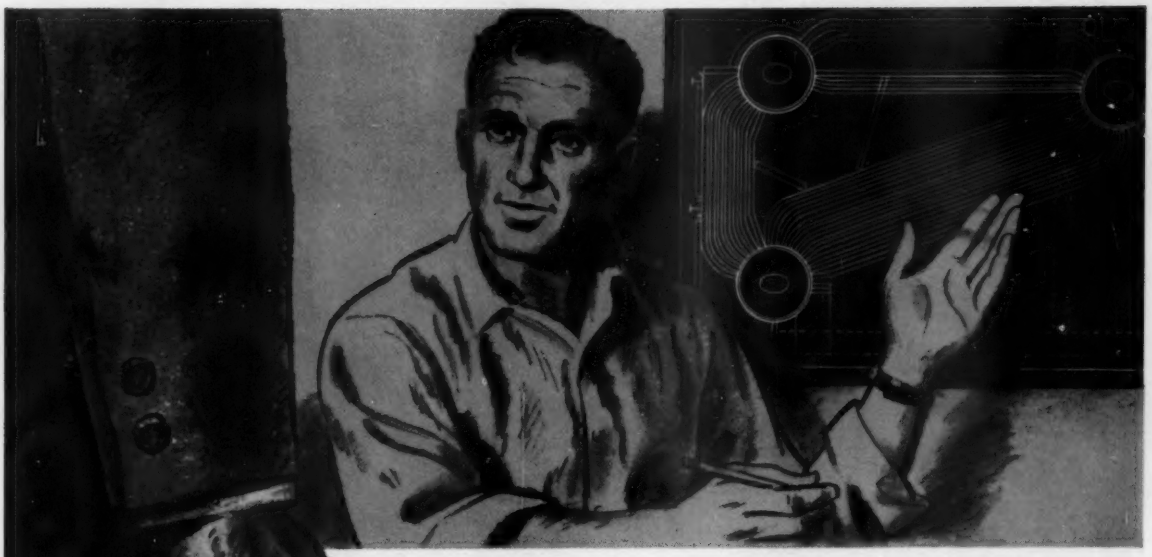
59—TERMINAL BLOCKS, sectional, hand assembly

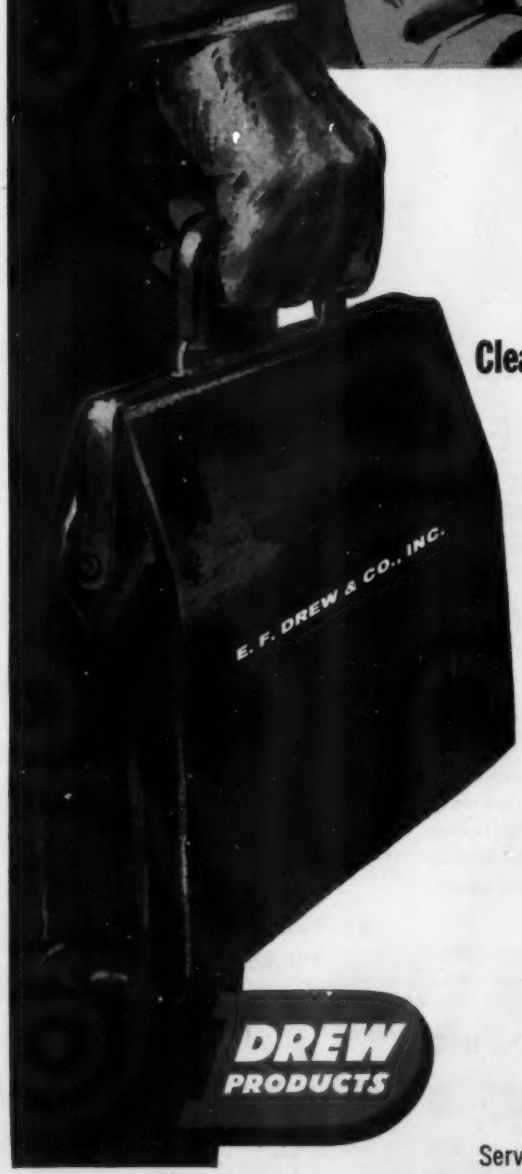
AlphaBlocks, Series N, are designed to provide a variety of quickly-assembled terminal-block combinations with only five major interchangeable parts. AlphaBlocks, having from one to 100 or more terminal pairs, with or without insulating barriers, can be made from a small box



of parts. Any combinations of single circuits and distribution strips can be assembled on the spot, without need of specially constructed blocks or separated strips. Company says no mounting rails, fasteners or special tools are needed for the assemblies.

Dovetail lugs and slots for joining units are located in the base of terminal blocks, insulating barriers and end pieces to give automatic self-alignment and strong mechanical connection upon assembly. Plastic insulating covers snap over the blocks and fit between insulating barriers. When AlphaBlocks are mounted on panels by bolts or screws through end pieces, they will not come apart, according to manufacturer, nor can they be rearranged without removal from the panel. Unmounted AlphaBlocks can be assembled or dis-





SLUDGE

Cleaning downcomers cost us 5 working days!

A large midwestern steel mill presented this serious problem to the Drew engineer.

The solution? As simple as this:

The Drew man, an experienced industrial water engineer, made a thorough study of the boiler plant and operating conditions. Pertinent water and sludge samples were analyzed at the modern Drew laboratories, and results interpreted. A course of action was charted, including the use of Drew Sludge Conditioner "U-14-L" and other treating chemicals.

The result? Sludge eliminated and boilers cleaned annually with just a hosing! Foaming—a long-existent problem was ended. As an added bonus, critical boiler outages and steam shortages are now "just a memory."

Call the Drew man, he can assist in solving your industrial water treating problems, too. Write for our brochure, "Complete Boiler Water Conditioning," and the address of the nearest Drew office. No obligation, of course.

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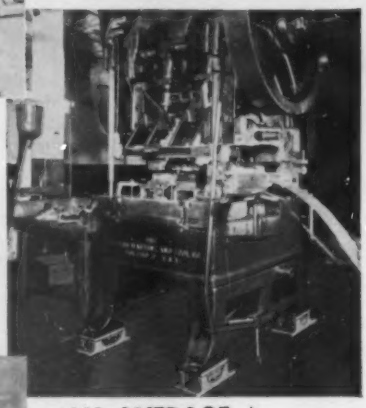
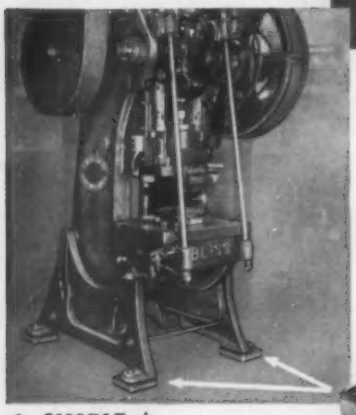
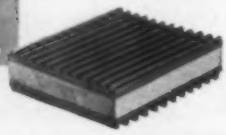
STOP VIBRATION *with* KORFUND VIBRATION CONTROL

A TOUGH PROBLEM solved by specially designed Korfund Steel Spring Vibro-Isolators. Shock from this 100,000#-600 ton capacity press was cracking building walls. Four specially designed 25,000# capacity Korfund Steel Spring Vibro-Isolators, themselves weighing 600# each, were installed under the press. Building damage stopped and heavy production schedules were maintained. Yet, the price of the special Korfund Isolators was less than 3% of the press cost.





AN AVERAGE PROBLEM—typical of those solved every day by Standard Korfund Steel Spring Vibro-Isolators. Vibration and noise from this double crank press, which could be felt and heard throughout the building, were stopped by Standard Korfund Steel Spring Vibro-Isolators. More and more manufacturers are discovering how Korfund Vibro-Isolators permit press installation without reinforcement of floors, permit press installation *anywhere* (even near precision equipment) for better plant layout, increase press speed and production, improve quality.



A SIMPLE PROBLEM solved inexpensively and effectively by Korfund Elasto-Rib Pads. In this case, Elasto-Rib Pads installed under each of the legs of this press stopped transmission of vibration and noise. For the less critical installation, Korfund Elasto-Rib Pads provide low-cost, effective vibration and noise control, and eliminate bolting to the floor.

PUNCH PRESSES are notorious for the amount of vibration and noise they transmit—yet in the three cases illustrated, Korfund Vibration Control units successfully solved the problem. In our files are scores of case histories describing equally satisfactory installations on many other types of machinery.

A selector chart is available giving recommendations for various vibration control problems. Write for your copy of Bulletin No. 13, or see our catalog in Sweet's Files.

For specific recommendations, contact us or the Korfund representative you'll find in most principal cities. A half-century of experience is at your disposal.

THE KORFUND CO., INC.

KORFUND VIBRATION CONTROL — SPRINGS — RUBBER — CORK

48-35R Thirty Second Place, Long Island City 1, N. Y.
In Canada: 510 Canal Bank, Ville St. Pierre, Montreal

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NEW PRODUCTS

(Begins on page 134)

mantled by hand, without tools, it is noted, and covers can be installed or removed at any time. Series N Alpha-Blocks are rated at 50 amp and 750 v. A larger series will be added later. Literature and prices are available. Alpha Electrical Products Co.

60—FORK LIFTS, diesel powered, for hazardous areas

Spark proof diesel powered fork lift trucks in 3000- and 4000-lb capacities are announced as suitable for areas where non-protected trucks are prohibited. Use of the diesel engine is said to eliminate hazards due to possible electric sparks. The engine is started by a hydraulic motor; energy for the starter motor is taken from a hydraulic accumulator, accessibly mounted, and filled by a manually operated pump adjacent to the driver's seat. After the accumulator has been filled constant pressure is maintained by the truck's standard hydraulic pump.

In these trucks, electrical dash instruments have been replaced by mechanical or pressure operated instruments. There is no battery, no electric generator. Low engine surface temperatures are further reduced by a water cooled exhaust manifold. A water muffler is also used to eliminate possibility of sparks passing out the engine exhaust pipe. The trucks are available with static-conductive tires and may be provided with a protective wood bumper on three sides and non-sparking metal forks. The Buda Co.

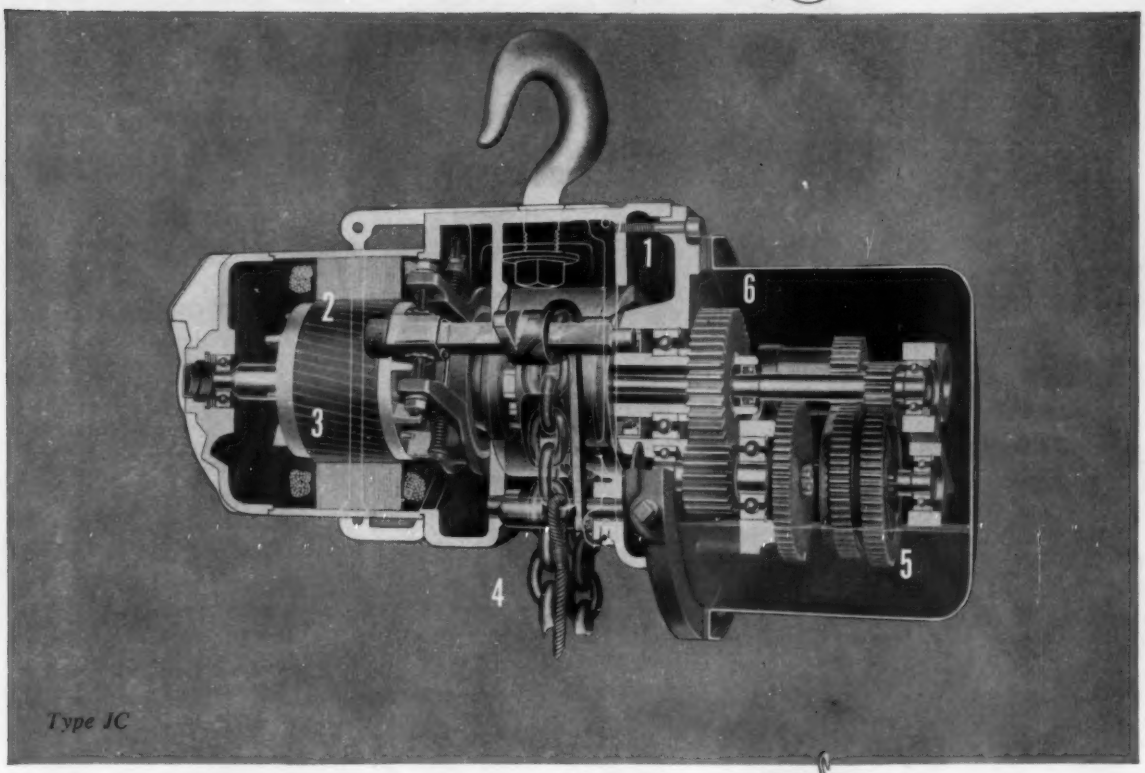
61—MOTORS offer new features in old frame sizes

A transition polyphase motor line in the 1 to 5 hp range, to be built in the old NEMA frame sizes and dimensions, will incorporate all new engineering and insulation features of this manufacturer's Tr-Clad 55 Motor, which is built according to the new NEMA dimensions. The transitions motors, offered for those who cannot take advantage of the new NEMA dimensions, will be available in popular ratings at premium prices already in effect for motors in the old NEMA frame sizes. The new transition motors incorporate such features as Mylar polyester film insulation, company's own Drifirm silicone water repellent core, solid cast rotors and modern appearance of Tri-Clad 55 Motors. General Electric Co.

62—VALVE for pressure reducing and regulating

Extremely low pressure drop and lockup are features announced for Standard Type 1260, a new pressure reducing and regulating valve. This self-contained, single-seat valve operates within a range of 300 psi inlet pressure and 3 to 250 psi delivered pressure. It is said to combine minimum size and weight with greater sensitivity and is designed for a wide range of applications, including water,

TAKE IT UP WITH R&M HOISTS·CRANES·WINCHES



Type JC

100 POUND GIANT—FOR 2000 POUND LIFTS

That's the Robbins & Myers JC electric chain hoist. Light weight for portability—high safety factor, combined with reliability and long life. Priced to justify power lifting for jobs now being done manually.

1 **FRAME**—Unit cast aluminum alloy, tensile strength 37,000-40,000 psi.
2 **MOTOR BRAKE**—Shoe type of ample area to stop hook quickly—assure accurate load spotting—long life.
3 **MOTOR**—½ HP Robbins & Myers, heavy duty rating.
4 **CHAIN**—Welded alloy steel. Withstands pull in any direction.
5 **LOAD BRAKE**—Weston type with non-reversing clutch.
6 **GEARS**—Precision cut from alloy steel, heat treated.

JC is available in 500, 1000 and 2000 pound capacities. Hook mounting and rope control are standard. Push type trolleys available for overhead rail installations. *Low* prices start at $188.

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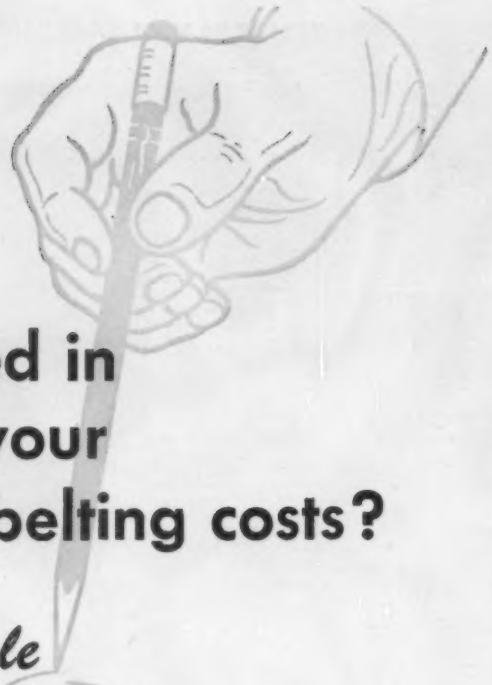

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Give us an opportunity to show you just exactly what Tannate has done for others—what Tannate can do for you.

Tannate is a high quality, special tanned flat leather belt. It has a built-in, glove-like grip that insures positive power transmission. It's strong and resilient—can absorb those heavy shock loads and protect your equipment. Its flexibility makes it excellent for use on small diameter pulleys and multiple pulley drives, such as serpentine or mule drives. Its thorough internal lubrication means a minimum of maintenance.

Tannate has proved itself for economy and efficiency on some of the toughest drives in industry today. It can do the same for you in your plant.

Our modern production facilities, in addition to the wealth of belting know-how gained during the past 250 years in business, is your assurance of a good, reliable source of supply. And, if you need it, technical assistance is available from our Engineers, specializing in mechanical power transmission.

Let us have the details on your present or proposed drives. Let us prove what Tannate can do in your plant.

Write J. E. Rhoads and Sons Company, 35 North Sixth Street, Philadelphia 6, Pennsylvania.

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NEW PRODUCTS

(Begins on page 134)

gas, steam, air, oil and other non-corrosive fluids.

Low pressure drop is achieved through use of the venturi principle—velocity of fluid passing venturi orifice creates suction, reducing pressure in lower diaphragm chamber and opening the valve wider to produce lower pressure drop. Another feature of the Standard Type 1260 is a spherical self-cleaning inner valve. A. W. Cash Co.

63—FHP MOTORS, split-phase, and capacitor start

A redesigned line of small fractional horsepower single-phase motors, ¼ hp and smaller includes capacitor-start and split-phase motors having shallower endplates which materially reduce their length, and ventilating openings below

centerline for dripproof construction. They have no ventilating openings in the frame, which is of heavy rolled steel. Sleeve bearing motors in the new design are lubricated by means of felt packing, cut to specified shapes and inserted in bearing housings with inner and outer seals. This type of construction is designed to prevent oil leakage and assure a constant supply of oil to the bearings.

Quick-breaking switch and thermal overload protector are attached to the terminal board mounted inside the stator frame, eliminating internal connections to endplates. These compact motors are available with sleeve or ball bearings, rigid or resilient bases. Bulletin MU-200 gives information. Wagner Electric Corp.

64—MIST COLLECTOR gets oil mist, smoke at source

For mounting on or near high speed grinding and cutting machines, the Electro-Staynew Mist Collector is said to remove over 90 per cent of oil mist and smoke and return clean air to the shop. Self-contained, the unit provides a "packaged" ventilating system for individual machine tools. Several advantages are announced for the three new models available, including unit construction. With this construction, ionizing and collecting chambers are an integral unit.

In operation, oil-laden air is drawn in at the unit base and metal chips and abrasive material are screened. Mist particles are positively charged in the ionizing section of the cell. Negatively charged

New B-47 jet bombers on a ramp at Boeing Airplane Company's Wichita, Kansas Division. Several types of cable from 4/0 to 500,000 CM single conductor cable are used in the underground feeder service on the ramp.

500,000 CM stranded, single conductor RoMarine-RoPrene cable used for underground feeder service on the ramp. Heat- and moisture-resistant insulation and oil-resistant sheath help assure dependability.

Where RoMarine-RoPrene® Power Cable helps keep more than a million watts of light blazing

When you are making jet bombers under an airforce contract, you can't afford to let "short circuits" or power failure interfere with production.

That's one of the important reasons why Boeing Airplane Company, Wichita, Kansas Division, specified Neoprene jacketed direct burial cable for the lighting system on its new ramp.

Nearly 10 miles of the 24 miles of cable serving as underground feeders for more than one thousand bulbs of 1,000 watts each are dependable RoMarine-RoPrene power cable. These bulbs turn darkness into daylight, permitting flight line crews to read blueprints in any part of the lighted area.

The RoMarine insulation is specially compounded for resistance to heat and moisture. The RoPrene (Neoprene compound) sheath provides exceptional protection against acids, oils, abrasions and flame.

Rome offers a complete line of power and control cables, type TW wires, portable cords, machine tool and hook-up wires . . . all engineered to the application involved . . . designed for easy installation and long, dependable service.

For further information, specifications, electrical data on RoMarine-RoPrene, mail the coupon for your copy of the Rome Power and Control Cable Catalog.

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Use of PYREX pipe in acid drain lines eliminates corrosion.

Eliminate pipeline corrosion

with PYREX® Glass Pipe

brand

Chemical plants have been using PYREX brand Glass Pipe for years to solve their severest pipeline corrosion problems. Other industries are discovering its advantages for acid drain lines and other chemical handling lines.

PYREX pipe will withstand virtually all acids and most alkalis. For example, carrying 5% hydrochloric acid at 212°F. continuously, PYREX pipe loses only .0003" of its thickness a year. At that rate it would take over 200 years to eat away 30% of the wall thickness. It would take over 600 years to eat completely through the pipe.

In addition to such sturdy corrosion resistance, PYREX offers such advantages as transparency (you can spot trouble in the line before it gets serious); ease of cleaning; exceptional resistance to sudden temperature changes and physical shock. Long-time users report that breakage is no problem. Your own men can install it without special training or experience.

PYREX Pipe Bulletin EA-1 will give you a more detailed story. Write for a copy today or check the indicated reference number on the enclosed Inquiry Slip.

Corning means research in Glass

CORNING GLASS WORKS, 30-3 Crystal St., Corning, N. Y.

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NEW PRODUCTS

(Begins on page 134)

collector plates then attract and separate oil from the air stream. Clean air continues through. When oil accumulates on the plates in droplets heavy enough to resist the air stream, it drops off the bottom edge, passing through the screen into a reservoir. Collected oil can be stored there (2 to 6 gal daily) or piped back to the machine. Bulletin 420 gives technical details. Dollinger Corp.

65—MOTOR STARTER also offers overload protection

This manual motor starter is designed for across-the-line starting as well as overload protection for fractional horsepower motors driving small machine tools, woodworking equipment, fans, blowers. Operation is by means of an "on" and "off" standard type toggle lever. The toggle mechanism is described as positive acting, producing quick make and quick break contacts which cannot be "teased" or stalled between open and closed. Snap action, twin break silver contacts are used to reduce arcing and provide increased contact life. The starter has straight through wiring with line terminals at top and load terminals at bottom.

An eutetic alloy thermal overload relay with inverse time limit features is incorporated in this starter and is offered in both double and single poles; both open and closed types. The enclosed starter is suggested for general application when other enclosures are not provided. The open type is suited for machine cavity mounting, back of plate mounting and wall mounting in a standard outlet box. Publication EC-1 gives details. Cutler-Hammer, Inc.

66—CONTROL UNIT signals end of ion exchange run

This electronic control, the Enditrol, is designed to indicate the end of the operating run of a hydrogen cation exchanger (hydrogen zeolite) unit. It is based on the theory that as the downflow hydrogen ion exchanger approaches exhaustion, the hydrogen concentration of the effluent has a higher conductivity than that of the upstream sample. Endpoints of ion exchange run can be determined by comparing conductivities of upstream sample and effluent. With proper electrical controls, device can also be used for initiating operation of existing automatic regeneration equipment. Operation of such units could be entirely automatic, it is explained, and would eliminate dangers of over-running and chemical and water waste caused by under-running. It may also be equipped with a relay which signals end of a run by an alarm or light.

In operation, a continuous flow of water is drawn from the upstream tap and comparison of this tap water with effluent results in a ratio that is constant until the resins approach exhaustion. The decrease in acidity moves downward dur-

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F-H Airslide and F-H Airfeeder transporting Portland cement from a silo to a screw conveyor. Rapid, clean, safe, economical, and efficient transfer of material.

Maybe your production is suffering because of stoppage and breakdown ills in your conveying systems. These can be very serious and costly . . . timeouts can never be recovered. When you have a "sick" conveying system, why not consult a specialist, one which has pioneered in the field of conveying by air for 26 years.

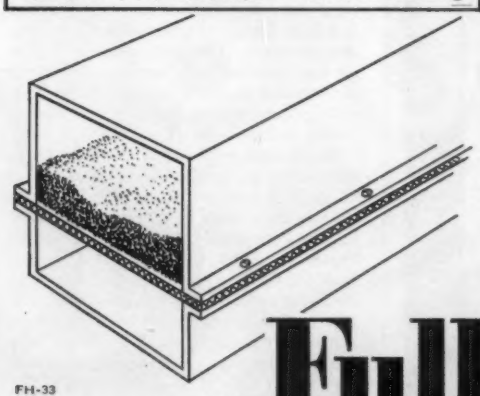
Fuller designs and builds four basic systems for conveying dry, fine materials, from which it can select and recommend the one, or a combination, to meet your own particular requirements, efficiently and economically. We have done it for thousands of others and can do it for you.

Illustrated is one of the four "conveying by air" systems we build, the F-H Airslide, which operates on the principle of fluidizing dry, fine materials with a small volume of low-pressure air, causing the material to flow like a liquid on a slightly inclined plane. Economical of operation, because, it has no moving parts, requires no lubrication, and power required is exceedingly low.

Fuller will be glad to make a study of your conveying ills and make recommendations, together with proposal drawings and estimates . . . with no obligation for this service.

Write today for Bulletin FH-2, illustrating and describing the F-H Airslide Conveyor.

Fuller Company is the exclusive manufacturer of air gravity conveyors, except for use in motor vehicles, under Huron Portland Cement Company U. S. Patent Nos. 2,316,814, 2,517,837, 2,527,394, 2,527,455, 2,527,466 2,527,488, 2,589,968 and Patents Pending.



FH-33
1834

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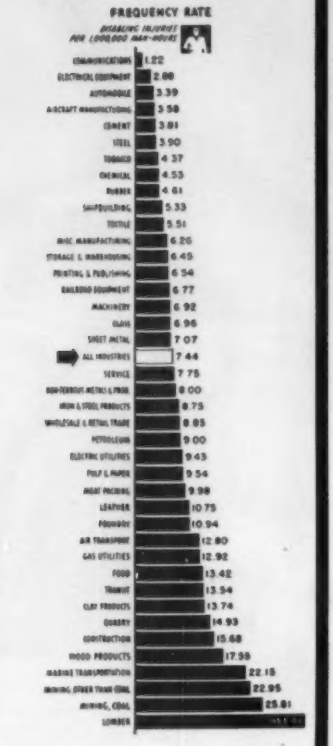
The COMPANY TREASURER knows

. . . that safety against slipping on plant floors is an unseen factor in the balance sheet . . .

. . . that every plant equipped with ALGRIP Abrasive Rolled Steel Floor Plate reduces its accident rate . . . its lost man-hours of production . . . its compensation payments . . . and its insurance rate . . .

Because ALGRIP . . . the world's only abrasive rolled steel floor plate . . . has a surface that makes slipping impossible . . . on level floor or incline . . . wet, oily or greasy . . .

And because ALGRIP's controlled-depth of abrasive penetration in the plate assures a constant, enduring safe-against-slip floor surface.



*National Safety Council's "Accident Facts" 1954 Edition

A.W. ALGRIP ABRASIVE ROLLED STEEL FLOOR PLATE

ALGRIP—*Approved for Safety by Underwriters' Laboratories.*

ALAN WOOD STEEL COMPANY
Conshohocken, Pa.

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NEW PRODUCTS

(Begins on page 134)

ing the run and when it reaches the tap, the ratio suddenly changes. This signals the end of the run. The control is declared equally applicable to anion exchangers used for silica removal where the anions are taken up by the ion exchange bed. The Permutit Co.

67—DUMP BOX, made of heavy gage steel

Announced for handling all types of materials and parts, this automatic dump box may be used with hand, power lift or fork truck, or can be picked-up and

moved by overhead hoist. Gravity latch locks box in upright position until ready for dumping. It is built of heavy gage steel with reinforced flange around top edge, has heavy angle legs, and reinforced plate at location of trunnion. Of all welded construction, box is 48 in. long, 36 in. wide, 24 in. deep inside—or can be built to specifications. Palmer-Shile Co.

68—CHEMICAL FEED DEVICE gives precise control

Designed to combine precise control with an accurate liquid level alarm, this chemical feed control apparatus comes in one small, high-visibility package. The unit can be used to regulate flow in any situation in which it is necessary to feed liquid chemicals, as in direct boiler feed and in many process purposes. Manufacturer says that one of its chief features is a high degree of adjustability in timing arrangements. The total time cycle, that of the chemical fed, and the length of non-feeding time can be set so that they will proceed automatically until chemical supply is exhausted or new setting used.

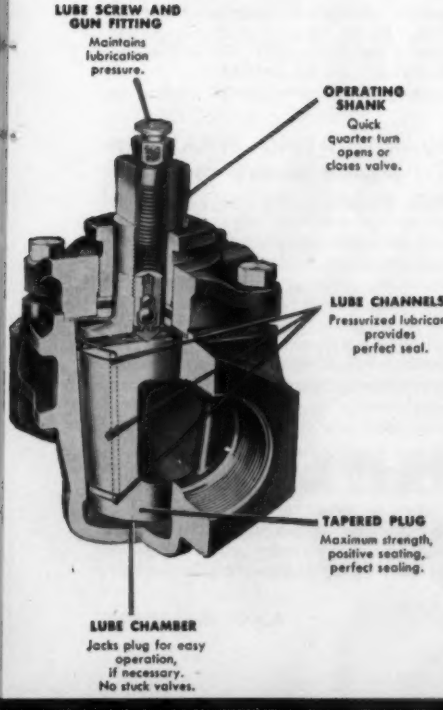
The liquid level alarm consists of an electric probe in the chemical tank, set at such a level as to give warning in time to allow tank to be refilled before it empties completely. The warning bell begins to sound when the level in any tank falls below the probe and continues until the operator throws a switch. The bell is then silenced, but an alarm light remains lit until that tank is refilled. To identify the low tank, operator simply sees which light is lit on the control box —one light corresponds to each tank.

For more facts circle 618 on Reply Card →

Let's Talk About Cost

Rockwell-Nordstrom Valves

Cost No More Than Ordinary Valves!


LUBE SCREW AND GUN FITTING
Maintains lubrication pressure.
OPERATING SHANK
Quick quarter turn opens or closes valve.
LUBE CHANNELS
Pressurized lubricant provides perfect seal.
TAPERED PLUG
Maximum strength, positive seating, perfect sealing.
LUBE CHAMBER
Jacks plug for easy operation, if necessary. No stuck valves.

You don't pay a penny extra for the trouble-free dependability of Rockwell-Nordstrom valves—proved through 40 years of lubricated plug valve leadership. In fact, it's the most economical valve you can buy at any price.

Pressure lubrication, which forms the famous Rockwell-Nordstrom leak-proof seal, also eliminates repair-replacement cost caused by the "wear-out" friction of metal-to-metal contact in ordinary valves. And the lubricant protects the valve working surfaces against corrosive and erosive line materials while keeping the plug free for instant, smooth quarter turn operation.

The valve seat, the part that wears out the fastest in ordinary valves, is *never* exposed to the line when you use Rockwell-Nordstrom valves . . . eliminates one of the biggest valve down time problems.

Remember, these exclusive advantages are *not premium priced*. While Rockwell-Nordstrom valves cost no more than most ordinary valves, that's just half the story . . . they'll outwear, outlast and outperform any other valves you've ever used.

Rockwell-Nordstrom valves are available in a full range of pressure-temperature ratings and sizes in steel, semi-steel and numerous corrosion resisting metal alloys. Send the coupon today for complete details. Rockwell Manufacturing Company, Pittsburgh 8, Pa.

ROCKWELL-Nordstrom VALVES

LUBRICANT SEALED FOR POSITIVE SHUT OFF

ROCKWELL MANUFACTURING COMPANY, Pittsburgh 8, Pennsylvania

5-C

☐ Please send me Bulletin V-215.

☐ Please send name of nearest Rockwell-Nordstrom industrial distributor.

Name_____ Title_____

Company_____

Street_____

City_____ Zone_____ State_____

fabricated from **POLYPENCO®/nylon shapes**

- Make one part or hundreds economically on standard metalworking tools
- Reduce wear on gears, bearings, gaskets, cam followers, etc.
- Eliminate lubrication
- Eliminate corrosion on exposed surfaces
- Eliminate backlash and noise
- Get top performance in every part with quality-controlled Polypenco nylon shapes

Immediate delivery of POLYPENCO nylon rod, tubing, strip and slab. We'll help you fabricate.

WRITE FOR GENERAL BULLETIN

POLYPENCO NYLON

nylon and teflon*/other non-metallics/stock shapes

The POLYMER CORPORATION of Penna. • Reading, Penna.
In Canada: Polypenco, Inc., 2052 St. Catherine W., Montreal, P. Q.

*trademark for Du Pont tetrafluoroethylene resin

For more facts circle 619 on Reply Card

NEW PRODUCTS

(Begins on page 134)

When the tank is filled, the light goes out and the bell sounds again, notifying the operator, who then resets alarm silencing switch to its original position. This silences the bell and resets the level alarm. The case is 24 in. wide, 34 in. high. All external wiring is brought to a single terminal strip. Graver Water Conditioning Co.

Use the Reader Service Cards provided on pages 199-200 to ask for more information on these products. Circle item number of products in which you are interested.

69—AIR FILTERS are offered in three basic types

Mechanical air filters in three basic permanent, cleanable, filter types, are suggested for use where low initial cost is an important consideration, where there is exceptionally heavy dirt loading, and where efficient filtering of larger airborne particles is acceptable. Among advantages claimed are low initial and maintenance costs, large dirt holding capacity and ease of servicing. Straining, adhesion, or some combination of these processes is utilized in the new mechanical air filters.

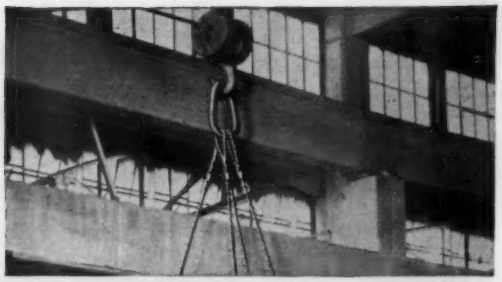
Of the three types, a panel impingement filter consists of galvanized screen filtering media arranged in closely spaced rows of double air scoops designed to assure efficient air filtering. Single panel and multiple banks of filters are available. A self-washer type incorporates an automatic washing attachment for banks of panel impingement filters which cleans the filters of collected dirt particles—a feature claimed to reduce maintenance costs. In the third, or traveling curtain, type, a motor assembly rotates the filter panels through an oil bath for constant cleaning of the filter media. Trion, Inc.

70—INSULATING SPRAY, improved air-dry coating

E-26, an air-dry coating, is announced as having desirable physical, chemical and electrical characteristics and broad application for insulation and protection. It can be used to protect and insulate bus bars, transformer and coil leads, motor coils, switch-gear, starters and controllers, says company, and it will insulate and moisture-proof terminal boards, permanent electrical connections, fuse boxes and panel boards. It may be used to protect short leads and pigtails as a substitute for tubing where necessary, it is pointed out, and can also be sprayed on surfaces as spot protection against corrosion.

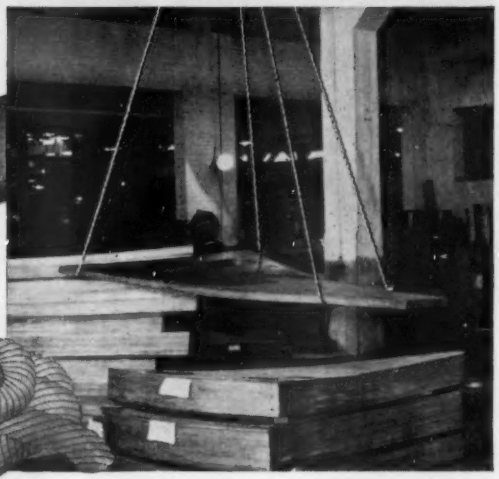
Among advantages claimed for E-26 is that it provides a coat 0.75 mils thick with one spray stroke, and the film can be built up by repeated application. The

PROVE Tuffy®



GIVES YOU MORE SERVICE PER DOLLAR

FREE Tuffy® SLING



ABUSE IT! MISUSE IT! IT WILL STILL PROVE TOUGHEST SLING OF ALL!

Do Your Worst to the free Tuffy Sling we send you! Loop it, kink it, jerk it, knot it—subject it to the conditions that ruin the most slings for you. You'll find Tuffy takes more rough treatment than any sling you've ever used!

Tuffy's Patented Construction is an exclusive, machine braided-wire fabric that's extra flexible to help resist kinking. If you *can* kink it, your Tuffy Sling is easy to straighten without material damage!

Send For Your Free Tuffy Sling and try it on the toughest tests you can devise. Find out for yourself why Tuffy Slings are the toughest you can buy!

Tuffy® HOIST LINE

Strong As Tuffy Slings! Tuffy Hoist Line is constructed to handle the varied strains of lifting over a long period of time . . . give you extra safety from drum to sling!

Easy To Order because there are no complicated specifications — just length, diameter and "Tuffy Hoist Line." Whether you use overhead, stiff leg or mobile cranes, derricks or clam shells, try Tuffy Hoist Line and see the difference!

Your Tuffy® Distributor Stocks to Meet Your Needs

When You Need Rope Fast, your Tuffy distributor is a handy man to know. Because he's happy to stock ahead of your replacement schedule . . . be ready with the rope you want, *when* you want it. Just give him an idea of your requirements and he will order from his nearby mill depot for months-ahead service. Talk to him *soon!*

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Specialists in High Carbon Wire, Wire Rope and Braided Wire Fabric

TEAR OFF AND MAIL COUPON *NOW!*

Union Wire Rope Corporation
2272 Manchester Ave., Kansas City 26, Mo.

At no cost or obligation to me, please rush the material I have checked.

- ☐ FREE 3-Ft. Tuffy Sling!
- ☐ FREE Sling Handbook and Rigger's Manual, Featuring 12 Tuffy Factory-Fitted Types!
- ☐ Name and Address of Tuffy Distributor Nearest Me!

FIRM NAME_____

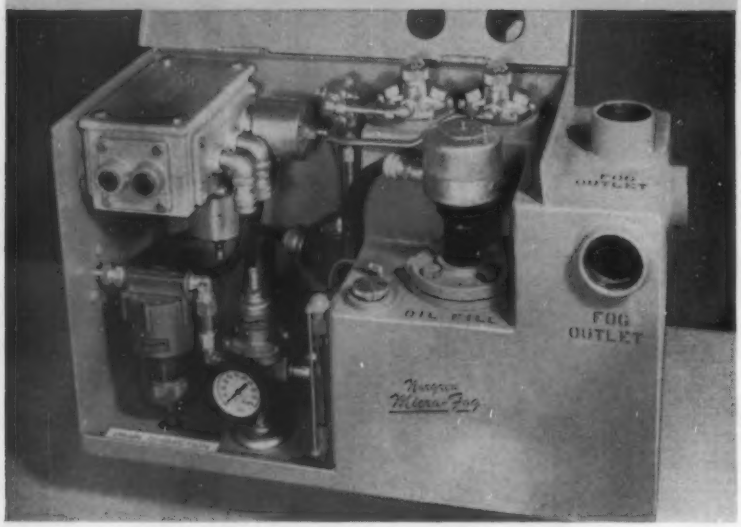
BY_____ TITLE_____

ADDRESS_____

CITY_____ ZONE____ STATE_____

For more facts circle 620 on Reply Card

Norgren Automatic-Drain Filter in Micro-Fog Lubro-Control Unit



New Lubro-Control model 33AB-4 lubricates up to 1000 bearing inches.

provides vital bearing protection automatically

prevents contamination of oil supply...

- **assures clean, dry air... removes grit, pipe scale and moisture from the air line**
- **drains automatically. Operates independently of air pressure fluctuation and air flow**

The unit shown above is a new development by Norgren .a large capacity Micro-Fog Lubro-Control Unit which provides centralized, *automatic* multi-bearing lubrication up to 1000 bearing inches. Two of these units on a large Cross Transfer-Matic (photo, right) in an automobile plant lubricate 350 ball bearings and 170 spur gears. The Norgren Automatic-Drain Filter is a vital part of this unit.

Filtering air that powers your tools, cylinders and other pneumatic equipment is essential for top equipment performance and low maintenance costs. Hundreds of users have proved the high efficiency of Norgren Automatic-Drain Filters. For complete data.

C. A. Norgren CO.
3443 So. Elati, Englewood, Colo.

...WRITE FOR CATALOG SHEET 3-6

Oil Fog Lubricators • Pressure Regulators • Air Filters • Valves • Hose Assemblies

For more facts circle 621 on Reply Card

NEW PRODUCTS

(Begins on page 134)

resulting finish is described as hard, yet flexible and able to withstand wear and long periods of exposure. It is also said to be characterized by excellent arc and corona resistance. Dielectric strength is given as 800 to 1200 v per mil. Available in clear and colors, E-26 may be applied by dip and brush as well as spray techniques. It comes in 12-oz push button Spra-Tainers which cost around $1.80, and may also be obtained in larger amounts in bulk form. Bulletin E-26 gives test data. Insl-X Sales Co.

71—RUBBER-BASE ADHESIVE for ceramic floor tile

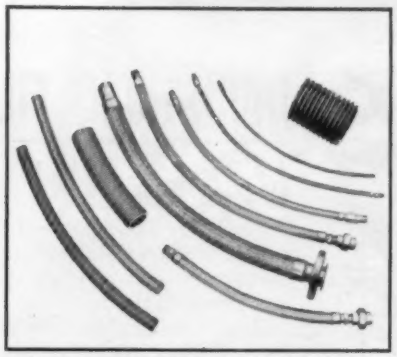
Ceramic floor tile can be installed faster and more economically with the 3M Brand CTA-12, it is announced. The new material is a soft mastic packaged in cans for instant use. It may be used on concrete, plywood, terrazzo or other types of sub-floors when setting ceramic mosaic floor tiles as well as glazed extra duty, pavers and quarry tile. A rubber base adhesive, this product has a floor covering capacity of about 75 sq ft per gallon and is claimed to leave the weight of the finished floor about ⅓ lighter, than when wet mortar is used.

According to company, two important advantages are offered by this material: only the thickness of the tile plus 1/16 in. for adhesive need be allowed in construction; and working conditions are cleaner. Grey in color, this adhesive is said to dry faster than mortar, and to form a tough, firm film that holds tile in place with a strength in excess of 40 psi. Adhesives and Coatings Div., Minnesota Mining and Mfg. Co.

72—PUSH-BUTTON SWITCH for hand tools

Designed to fit conventional "FS" and "FD" electrical boxes, the 1PH1 is announced as an aluminum-covered push-button hand switch for use on punch presses and similar hand-operated equipment. It is 2¼-in. in diameter, manufacturer points out, providing for easy manual operation, and has a snap-action spring. A Neoprene gasket between base of the switch and mounting surface, and a seal boot between button and plunger mechanism are designed to seal the switching unit from oil and other foreign matter. Flutes and holes in the cover plate are provided for the escape of any chips, dirt or oil which may travel inward with the plunger, preventing binding or jamming.

The switching unit has two double-break circuits—one normally open and one normally closed. A snap-action spring causes one set of contacts to break before the other set makes contact. Pilot duty rating of switch is 6 amp (normal) and 60 amp (inrush) at 125 v a-c; 3 amp normal and 30 inrush at 250 v ac; 1.5 amp normal and 15 inrush at 480 v a-c; and 1.2 amp normal and 12 inrush at 600 v a-c. Micro Switch Div., Minneapolis-Honeywell Regulator Co.

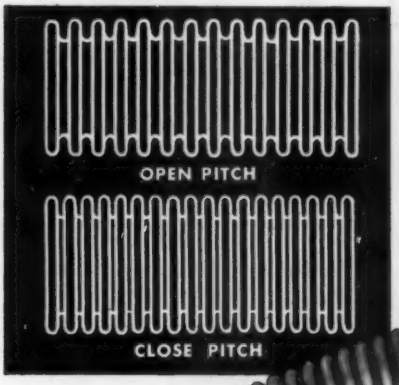


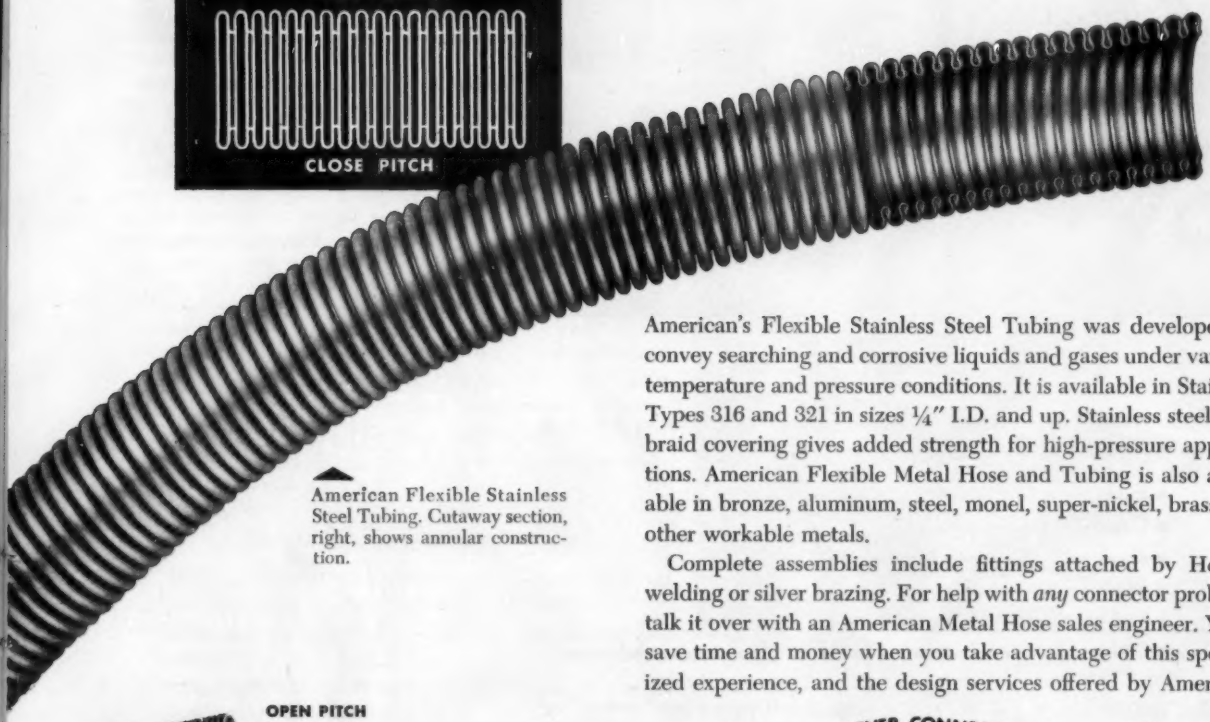
Typical American Stainless Steel Tubing and assemblies designed and manufactured for specific service conditions.

To convey high-temperature, high-pressure CORROSIVE gases and liquids... AMERICAN'S

FLEXIBLE STAINLESS STEEL TUBING

stands up under continuous flexing
absorbs severe vibration
compensates for misalignment
is easily installed





American Flexible Stainless Steel Tubing. Cutaway section, right, shows annular construction.

American's Flexible Stainless Steel Tubing was developed to convey searching and corrosive liquids and gases under varying temperature and pressure conditions. It is available in Stainless Types 316 and 321 in sizes ¼" I.D. and up. Stainless steel wire braid covering gives added strength for high-pressure applications. American Flexible Metal Hose and Tubing is also available in bronze, aluminum, steel, monel, super-nickel, brass and other workable metals.

Complete assemblies include fittings attached by Heliarc welding or silver brazing. For help with *any* connector problem, talk it over with an American Metal Hose sales engineer. You'll save time and money when you take advantage of this specialized experience, and the design services offered by American.

58177

OPEN PITCH for general service

CLOSE PITCH for extra flexibility, frequent movement, excessive vibration

STAINLESS STEEL BRAID gives added strength for high-pressure service

ASSEMBLIES made up to your specifications complete with fittings attached

WHEREVER CONNECTORS MUST MOVE

AMERICAN FLEXIBLE METAL HOSE AND TUBING

AN **ANACONDA®** PRODUCT

FREE FOLDER!

Four-page folder gives engineering data on construction and types. Includes pressure ranges, bending diameters, weights, data on fittings.

Write *today* for your copy. *Please print.*

PLE

The American Brass Company, American Metal Hose Branch, Waterbury 20, Connnecticut.

Please send me a copy of Bulletin STC-1, "Flexible Stainless Steel Tubing by American."

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COMPANY.....

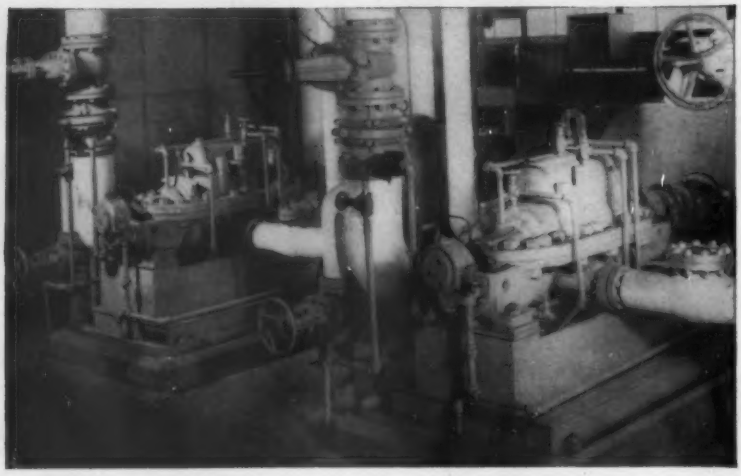
STREET.....

CITY.....ZONE.....STATE.....

For more facts circle 622 on Reply Card

PRODUCTION CONTINUITY

Begins in the Boiler Plant



Warren Six Stage Boiler Feed Pumps installed at a Southern Board and Paper Mill.

Boiler Feed Pumps may look much alike, type for type, but it is well to keep in mind such intangible factors as:

- Experience and integrity of the manufacturer
- Dependability of product
- Know-how, Workmanship, Service
- Maintenance and Repairs
- Lost production due to down-time
- Early replacement because of "tight" original recommendations

It is impossible, of course, to get these items into your "specs," or the supplier into his "quotes," but don't overlook their importance with relation to price, possible future requirements and *production continuity*.

Get your share of "intangibles" . . . specify

WARREN QUIMBY PUMPS

P-34

WARREN PUMPS

WARREN STEAM PUMP COMPANY, INC.

Warren, Massachusetts

For more facts circle 623 on Reply Card

INDUSTRIAL FILMS

All About Steel

THE MANY PHASES of steel production, steel fabrication and erection, and steel product application are shown in a selection of films.

"Highlights in Steelmaking" is a basic film on production, while "Steel Spans the Chesapeake" and "Building the Golden Gate Bridge" are two construction pictures. "The Open Road" is a color film describing the building of highways.

All the films are available from Bethlehem Steel Co., Bethlehem, Pa.

Increasing Storage Space

THIS 16 mm black and white sound film is an actual job study of the manufacturer's new "Box Grab," designed to increase storage capacity and cut costs.

The film describes unloading, stacking and loading-out of wooden lugs with the attachment, which, it is claimed, eliminates need for pallets by side-squeezing loads. In one instance, the movie shows an example of increasing storage area by raising unit loads 14 ft to the floor above. Arrangements to see this film may be made through the local dealer of the Hyster Company, 2902 N. E. Clackamas St., Portland 8, Oregon.

"The next guy who fiddles with my set up during lunch hour better have his group insurance paid up."

Die Casting

"DIE CASTING — How else would you make it?" is a 16 mm color film describing a die casting process said to reduce costs and improve product design. Running time is 35 minutes.

Bookings for the film are made by the American Zinc Institute, Inc., 60 E. 42nd St., New York 17, New

CLEAN AIR ELECTRONICALLY

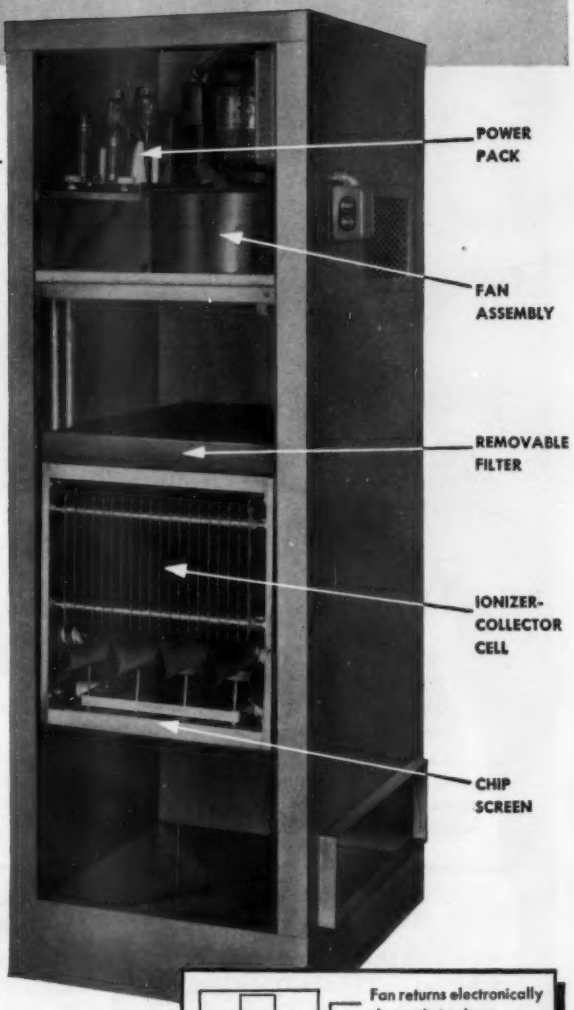
NEW - - - - - - - - - -

Electro-Staynew MIST COLLECTOR

PACKAGED VENTILATING SYSTEM FOR MACHINE TOOLS

REMOVES OIL MIST AT ITS SOURCE

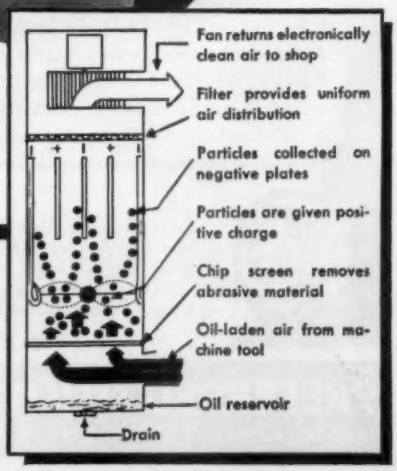
Specifically designed to be mounted on or near high speed machine tools, Electro-Staynew Mist Collector draws contaminated air from around grinding, cutting operations *removing over 90%* of the oil mist and smoke *electrostatically*. This self-contained, Dollinger-engineered unit distributes cleaner, purer air in the shop, cutting costs on sickness and maintenance expense. And . . . even greater savings are realized in heating costs as it is no longer necessary to exhaust contaminated air to the outside.



Look at these outstanding features!

- **UNIT CONSTRUCTION**—ionizing and collector cells are combined into one unit; thus only one unit to service.
- **EASE OF INSTALLATION**—needs only electrical and duct connections.
- **DEMOUNTABLE COMPONENTS**—all components can be easily removed without tools.
- **ADVANCED SAFETY FEATURES**—assure complete protection of personnel.
- **MINIMUM MAINTENANCE**—designed to be practically self-cleaning.

HOW IT WORKS!


Fan returns electronically clean air to shop
Filter provides uniform air distribution
Particles collected on negative plates
Particles are given positive charge
Chip screen removes abrasive material
Oil-laden air from machine tool
Oil reservoir
Drain

For complete information, write today for Bulletin 420.

DOLLINGER MIST COLLECTOR ELECTRO-STAYNEW

DOLLINGER CORPORATION • **55 Centre Pk., Rochester, N. Y.**

ALL TYPES OF FILTERS FOR EVERY INDUSTRIAL NEED

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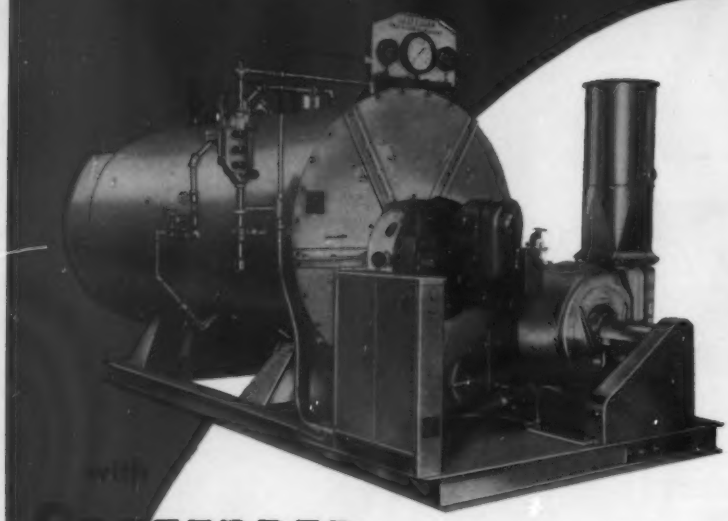
You're SURE to REDUCE Your Steam Costs



with

PREFERRED UNIT STEAM GENERATORS

With Preferred Unit Steam Generators in your boiler room you're sure to SAVE through
Lower installation cost • Lower steam production cost
Lower supervision and maintenance cost.

In a Preferred you get a "package" boiler with built-in features that assure a minimum of 25 years of operating efficiency. It's the difference in quality of engineering, design and construction that accounts for Preferred's leadership in performance.

ONLY PREFERRED GIVES YOU
***ALL THESE* BIG DESIGN FEATURES**

- Induced Draft • 5 Square Feet per Boiler Horsepower
- 4-Pass Gas Travel • Down Draft Design • Staggered Tube Layout
- Anti-Stress Deck • Intermediate Furnace Position
- Fully Automatic Operation with Oil or Gas
- No Special Foundation or Stack Required
- Self-Contained • Compact • Space-Saving

Every Preferred Unit Steam Generator is custom-built to your requirements, completely coordinated and factory fire tested before shipment. Available in sizes from 20 to 600 BHP and pressures from 15 to 250 psi, to burn heavy or light oil, all gases or combination oil and gas.

Write for Bulletin 2000

PREFERRED UTILITIES MFG. CORP.
1860 BROADWAY DEPT. PL-7 NEW YORK 23, N. Y.

For more facts circle 625 on Reply Card

York. On acceptance of bookings, arrangements may be made on request, to provide technical commentators and exhibits for each film showing.

A 28-pp booklet, "Die Casting—Molten metal to finished part . . . direct," is available for distribution following the film presentation.

Coated Abrasive Belts

THIS COLOR SOUND FILM, "Coated Abrasive Belts Speed Metal Working Production," is designed to show how coated abrasive belts speed up production and improve a product's appearance and sales appeal.

The film depicts adaptability of the belts and available machinery for mass production finishing of a wide range of metal parts.

Inquiries concerning this film should be directed to Behr-Manning, Box 808, Troy, New York.

"Doing some painting?"

Clean Waters

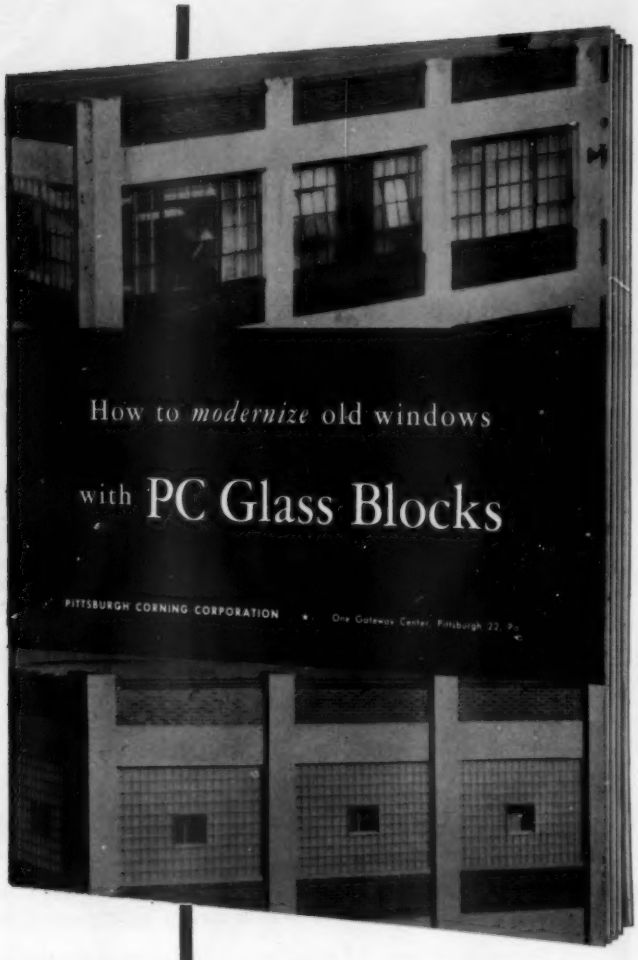
THIS NEW VERSION OF "Clean Waters," a film calling attention to pollution of water resources, is the latest in General Electric's "More Power to America" series.

The 25-minute, full-color, sound movie shows the importance of clean water to the individual and his community, and outlines the need to combat existing and future pollution areas. Industrial waste treatment and modern sewage disposal methods are illustrated.

Metal Forming

A PROCESS of metal forming, considered to be one of the most up-to-date means of producing many aircraft, jet engine, guided missile and helicopter parts, is the subject of "Precision Metal Forming," a 31-minute color movie.

The film traces the development of the Radial Draw Former, a machine which combines the principles of ro-



FREE BOOKLET

Shows you how to modernize windows with PC Glass Blocks

If you want to peel 20 years off the apparent age of your building, cut heating bills, window washing and maintenance headaches and drastically improve the quality of the daylighting inside, fill in the coupon at the bottom of the page and send for Pittsburgh Corning's new booklet on window modernization.

The booklet shows *before* and *after* pictures of typical buildings that have had the PC Glass Block face-lifting treatment. Actual benefits are included that will give you a good guide as to the savings you can expect. There is a simplified selection guide that enables you to pick the best block pattern for your particular location.

Whether you expect to modernize now or in the future, you should have this valuable 8-page booklet in your files. Just send the coupon.

Pittsburgh Corning Corporation
Dept. PG-35, One Gateway Center
Pittsburgh 22, Pa.

Send me a free copy of your new Window Modernization booklet GB-104.

Name .....

Company .....

Address .....

City & Zone ..... State.....

If you would like a window modernization survey made of your building(s) at no obligation, check here. ☐

PC Glass Blocks

PITTSBURGH PC CORNING ®

ALSO SKYTROL® AND FOAMGLAS®

In Canada: 57 Bloor St., W., Toronto, Ontario

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100,000 Satisfied Customers

Keep Plants Clean, Safe, Productive

with

INVINCIBLE Vacuum Cleaners

Of the more than 100,000 Invincible Industrial Vacuum Cleaners now in use, over 5,000 have been in service for 25 years or longer.

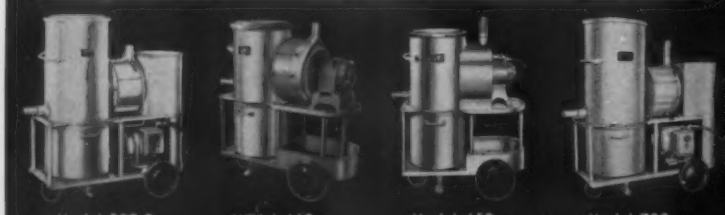
In factories, offices and warehouses, Invincibles are the key to good housekeeping, healthful working conditions and more production. They're ruggedly built to give years of trouble-free service and low maintenance cost.

Invincibles also do an excellent job of reclaiming and conveying scores of industrial materials other than dust and dirt.

SEND FOR BOOKLET—It tells about the thousands of Invincibles now in service.

INVINCIBLE VACUUM CLEANER MFG. CO.

DOVER, OHIO



Model 809-B —5 H. P. Dirt Capacity, 3 cubic feet

Model 460— 1½ H. P. Dirt Capacity, 3020 cubic inches

Model 450— 1½ H. P. Dirt Capacity, 3020 cubic inches

Model 700— 7½ H. P. Extra Heavy Duty

For more facts circle 627 on Reply Card

tary stretch and rotary compression forming, and shows uses of the latest model in production of metal parts. It concludes with a glimpse of the giant machines soon to be used in the aircraft industry. This movie is available on application to The Cyril Bath Company, 32252 Aurora Rd., Solon, O.

Industrial Film Listing

CATALOG B-6505, 36 pp, gives complete information on Westinghouse Electric Corporation's sound motion and slide films. It classifies subjects into groups of general interest; product information; training films and instruction courses; and gives information to aid in promoting showings to professional and other groups.

Order forms for 16-mm sound films, in color or black and white, are enclosed with the catalog which may be obtained by writing the company at P.O. Box 2099, Pittsburgh 30, Pa.

Canvas Protection

INFORMATIVE without being too detailed or technical, the film "Flamefoil Canvas Protection" shows the safety and service features of fire, mildew and water resistant canvas under varying climatic conditions and situations.

This color film is available on loan from The Princeton Film Center, Inc., Princeton, N. J.

Band Machining

A NEW BANDING technique which speeds up machining jobs by removing metal in sections, instead of reducing it to chips, is shown in a 16 mm technicolor film, "Production Band Machining."

Running 30 minutes, the film takes viewers through all the operations involved in machining a number of different parts. It is available on a free loan basis on written request to the DoAll Company of Des Plaines, Illinois, well in advance of the desired showing date.

"Choosing the Right Valve"

PREPARED ESPECIALLY to help those men responsible for the specification, operation and maintenance of industrial piping systems, is this 16 mm sound film titled, "Choosing the Right Valve."

Running 35 minutes, the film covers the basic types of valves, their variations and proper use.

Prints are available by writing Crane Co., 836 S. Michigan Ave., Chicago 5, Illinois, or through company branches or representatives.

A
B
C
D
E
PROPER COOLANT FILTRATION CAN:
A Eliminate frequent throwaways, reducing amount of coolant used by as much as 50%.
B Cut number of wheel dressings in half, increasing wheel life.
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A filter's got to be good—and right to save money

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For fuel, hydraulics, lube . . . any fluid – in thousands of applications in industry . . . filters that are properly selected and installed pay for themselves in a surprisingly short time. They render a substantial saving month after month from then on. You want facts, not adjectives? Take a look at the information on grinder coolant filtration in our illustration.

Naturally you'll insist on a quality filter. That goes without saying if you specify Purolator. But using the correct filter for your application can make a surprising difference in money saving results, too.

The Purolator line has been developed on a broader scale than any other filter line for just that reason. Purolator gives you a wider selection of standard units so your exact requirements can be met economically. And you get the valuable technical assistance of America's oldest and most experienced filter manufacturer to guide you in selecting the best unit for you.

This combination of engineering and manufacturing experience can add up to substantial savings. Send for Purolator's General Industrial Catalog, or better yet, ask us specific questions about possible filter applications in your plant. No obligation, of course. Address Dept. Pl-34, Purolator Products, Inc., Rahway, N. J.

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Distortion is Controlled in BRAD FOOTE'S DEEP CASE HARDENING

The BRAD FOOTE
DEEP* CASE HARDENING *process has been perfected to a degree which practically eliminates distortion

GEARS RUN TRUE

No place is distortion control more important than on heavy duty gears which are run almost continuously at full rating and subjected to extreme shock loads such as are encountered in rolling mill operations. BRAD FOOTE **DEEP CASE HARDENED** gears run true and distribute the load evenly across the full face and on the designed bearing surfaces of each tooth.

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In addition, BRAD FOOTE rigidly controls to set standards the depth of **DEEP CASE HARDENING** and the carbon content. The tooth surfaces are of maximum hardness for long life, but the carbon content is gradually diminished at successive depths below the surface until it blends to the metal of the core itself.

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Thus the cores of the teeth and the body of the gear remain ductile and shock-resistant while the teeth are given an increase in service life of over 50%.

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It will pay you to try a set of these gears on your toughest job. Send your specifications today for quotation.

BRAD FOOTE *makes* Spur, Bevel, Helical, Spiral Bevel, Herringbone, Zerol, Worms, Worm Gears, Reducers, Transmissions

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NEW BOOKS

for the plant engineer

Aluminum Data

ROD, BAR AND WIRE Product Information. Size 8½ by 5½ in.; 160 pp; illustrated; cloth bound; first edition, 1954. Available from Kaiser Aluminum & Chemical Sales, Inc., 919 No. Michigan Ave., Chicago, Ill. Price $2.00.

ENGINEERS and other industrial people should find this comprehensive book useful in the selection of aluminum products for various applications.

The book contains information on the production of aluminum and covers properties and characteristics of rod, bar and wire. It also presents data on alloys, dealing with application, fabrication and finishing methods.

All aluminum alloys are designated by the four digit index system in accordance with the new identification set-up adopted by the Aluminum Association. Old designations are shown in some cases to permit the making of comparisons.

Descriptive words and definitions are included in the book in the form of a glossary.

Motor Control

MAGNETIC CONTROL OF INDUSTRIAL MOTORS by G. W. Heuman. Size 9¼ by 6⅛ in.; illustrated; 714 pp including index; cloth bound; 1954 edition. Published by John Wiley & Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. Price $9.50.

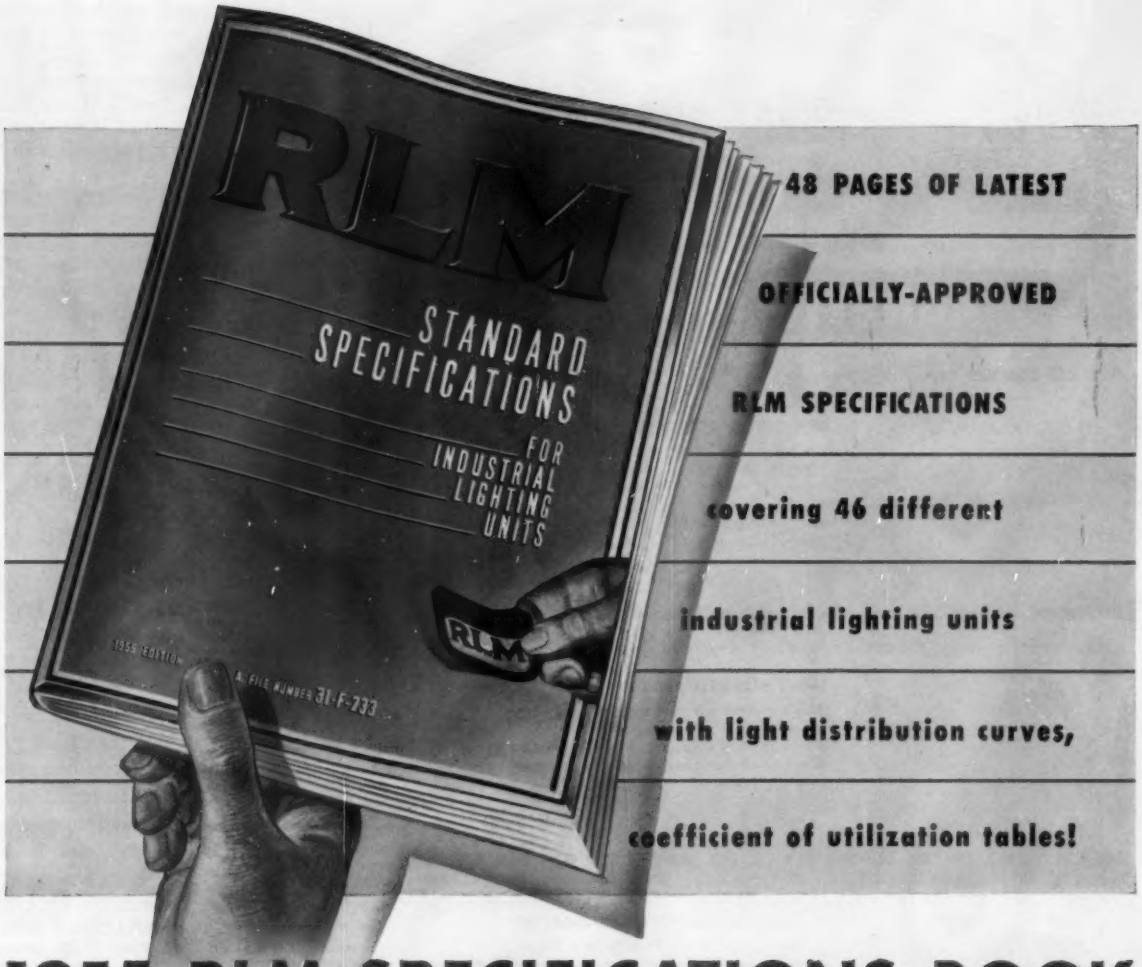
THE LATEST VERSION of the book is 20 per cent longer than the first edition published in 1947. It contains an analysis of modern types of motor control, engineering application data and maintenance information.

Two of the early chapters in the book are devoted to the principles of direct and alternating current motor operation. Among the other topics of discussion in the 20 sections of the book are the following: a-c and d-c contactors and relays, resistors and rheostats, control circuits, electronic and pilot devices and brakes.

Material Handling

CONVEYORS AND RELATED EQUIPMENT by Wilbur G. Hudson. Size 9 by 6 in.; 524 pp including index; illustrated; cloth bound; third edition (1954). Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. Price $9.00.

THIS WORK on the applications and limitations of material handling and related equipment, about 25 per cent larger than its previous edition, con-



1955 RLM SPECIFICATIONS BOOK

Complimentary Copies Now Available... Get Complete Details on

12 ADVANCEMENTS IN INDUSTRIAL LIGHTING!

Today, specification of industrial lighting units bearing the RLM Label is more important than ever. When you get your copy of the new 1955 Edition RLM Specifications Book and read more about the twelve advancements listed here, you will see why. You will read how these advancements improve overall efficiency up to 5%; relieve brightness contrast two ways; reduce glare; reduce light losses; provide greater ease of maintenance and safety from electrical hazards; make installation easier and less costly; reduce the amount of trapped light; reduce lamp failures; prolong life of unit.

In addition, you will find many helpful tips on lighting equipment specifications in the expanded introductory pages. Here you will also find many of the "hidden benefits" of the new advancements in RLM Specifications. If your work is at all concerned with industrial lighting equipment, you should not be without this valuable reference work.

Your copy of the 1955 RLM Specifications Book is available without cost or obligation. Please address request on your letterhead to:

RLM Standards Institute, Suite 831, 326 W. Madison St., Chicago 6, Ill.

New RLM Specifications for:
1. ALL-WHITE PORCELAIN ENAMEL REFLECTORS (Inside and Outside)
2. INCREASED UPWARD LIGHT
3. MAXIMUM BRIGHTNESS
4. BETTER SHIELDING ANGLES
5. HIGHER REFLECTION FACTORS
6. HIGHER LIGHT OUTPUT
7. CAPTIVE LATCHING and HOLDING DEVICE
8. GROUNDED BALLAST MOUNTING
9. CHANNEL DESIGNED for SLIDING HANGERS
10. REVISED LAMP SPACING
11. IMPROVED LAMPHOLDERS
12. ENTIRE UNIT RUST-PROOFED
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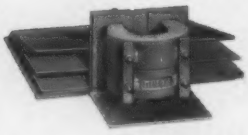
NEW DINGS RECTANGULAR SUSPENDED MAGNET

For pulling iron from fastest belts, deepest burdens, here's the mightiest member of Dings force—RM models available to pull iron through 30 inch air gap. New Dings RM uses less current, weighs less in proportion to strength—design takes less room, dissipates heat faster. Write for bulletin on the most powerful rectangular magnet yet.

DINGS MAGNETIC PULLEYS

Here's perfect low cost iron removal for normal belt burdens. Dings electric or non-electric Alnico pulleys—strongest you can buy—hold magnetics in an iron grip, discharge them separately. Ask for catalog.



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Put a stack of steel blanks in a Dings Sheet Floater and magnetic force fans them out so they're easily grasped. Users have found these units pay for themselves in 2-3 months' time, through increased output. Send for catalog.

DINGS MAGNETIC COOLANT SEPARATORS

Keep coolant free of abrasive particles, prevent pieces from being scratched and wheels from clogging. Tools stay sharper and there's less wear and tear on machines and parts. Write for Coolant Separator Bulletin.

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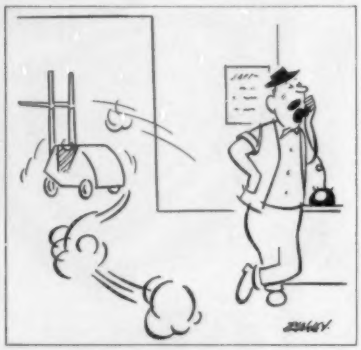
tains new material on fundamental developments of recent years in belt construction and dynamatic drive control. The book also considers cost and designs of silos, bins and bunkers giving attention to the West Coast development of the low-cost laminated fir silo.

Boiler house coal handling, storage, and transportation of coal in pipelines are also given consideration. Many illustrations and typical problems and solutions increase the usefulness of the book to students and engineers.

Some of the other items covered in this 22-chapter publication are as follows: crushers, hammermills, pulverizers, car unloading and weighing, and dust explosion hazards.



"Yes sir, Chief, right away. I'll send a fork truck for it."

Machine Shop Facts

MACHINE SHOP OPERATIONS AND SETUPS by H. W. Porter, C. H. Lawsche and O. D. Lascoe. Size 9½ by 5¾ in.; 397 pp including index; illustrated; cloth bound; 1954 edition. Published by American Technical Society, 848 East Fifty-Eighth St., Chicago 37, Ill. Price $5.50.

A GREAT DEAL of fact finding, including a national survey, preceded the publication of this instructive book on machine shop operation and equipment. In addition to carrying information on such items as the lathe, shaper, planer, grinder and milling machine, the book covers measuring as well as bench tools. Liberal use of photographic illustrations and sketches help the reader in getting a good grasp of the text material.

Cylinders in Industry

AIR AND OIL CYLINDERS in Industrial Applications by Elmer F. Heiser. Size 10¾ by 8 in.; 122 pp; cloth bound; illustrated; 1954 edition. Published by The Industrial Publishing Co., 1240 Ontario St., Cleveland 13, Ohio. Price $5.00.

OVER A PERIOD of about 18 years the author of this book was confronted with problems and questions dealing

time studies prove it!

Alemite power methods of lubricant transfer are 63% faster!

Alemite cuts costs!

where hundreds of hungry bearings make ordinary lubrication costly...

YOU SAVE...STEP BY STEP!

An important saving in *man-hours*, in that 63% figure. But nothing compared to the savings in *machine-hours*. Time *isn't* spent in down-time for lubrication—time *isn't* wasted making costly repairs due to bearing failure. And the reason for these savings is that only "refinery-clean" lubricant reaches bearings—machines operate at the peak longer—costs go *down!*

There's a combination of Alemite transfer pump and bucket pumps just right for your plant, large or small. Transfer Pumps fit either 100 or 400 lb. drums, all types of lubricants. Bucket Pumps are available to service any machine—handle any lubricant from lightest oils to heaviest viscous greases. Delivering pressures up to 15,000 psi to fit your needs. All of them are completely sealed, preventing contamination, reducing fire hazards.

A 400-pound barrel of lubricant arrives at the plant—sealed, fresh, "refinery clean."

An Alemite Air Operated Transfer Pump is inserted in the bung-hole. It is threaded to fit—completely reseals the barrel.

In less than a minute a 25-pound bucket pump is filled—no contamination—no air pockets—no mess or waste!

Now the bucket pump is ready to service hundreds of hungry bearings with lubricant that is protected all the way from barrel-to-bearing!

With Alemite Plan "B"
Only Refinery Clean Lubricant Reaches Machines

This combination of Alemite transfer pumps and bucket pumps is known as Alemite Plan "B." It is one of the five plans that your trained Alemite representative can show you. Ask him for your free copy of the new Alemite booklet: "5 Plans for Better Plant Lubrication"—or use the coupon at the right. It will show you how to save money in your plant.

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Ask Anyone in Industry

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THE FACTS OF LIGHT
and THOMPSON
Servisafe
POLE UNITS
FACT NO. 1: ONLY "SERVISAFE" UNITS PERMIT GROUND LEVEL MAINTENANCE FOR POLE-MOUNTED LUMINAIRES. A disconnecting and lowering hanger mechanism allows workman to lower luminaire for servicing and then reposition it with minimum effort and complete safety.
FACT NO. 2: ALL SERVICING HAZARDS ARE ELIMINATED. Workman has both feet on the ground and both hands on the job at all times. In addition, lowered fixture is "dead" because live contacts remain at pole top.
FACT NO. 3: SERVICING TIME AND COSTS ARE REDUCED TO MINIMUM. One man, using only a light vehicle, now can maintain pole-mounted luminaires in a fraction of the time formerly required. Faster servicing and elimination of costly auxiliary equipment assures substantial savings as well as increased lighting efficiency.
FACT NO. 4: "SERVISAFE" POLE UNITS ARE SUPPLIED AS COMPLETE PACKAGES READY FOR WIRING AND ERECTING. Featuring decorative as well as functional qualities, both single and double-arm models can be furnished with a variety of new steel and aluminum poles. "Servisafe" Bracket Units for wall and wood pole mountings also are available.
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with cylinders. He gives consideration to some of these, and uses over 200 sketches to help clarify his presentation. The book is relatively brief in its treatment of individual topics and attempts not to burden the reader through elimination of heavy technical discussions.

The publication offers information on cylinder design, selection and application. Among the subjects covered in the 21 chapters are the following: types of industrial cylinders, cushions in cylinders, specifications and ordering, port sizes, packings, alignment, action and control.

Electrical Code

ABBOTT'S NATIONAL ELECTRICAL Code Handbook. Size 8¼ by 6 in.; illustrated; 642 pp including index. Published by McGraw-Hill Book Company, 327 W. 41st St., New York 36, N. Y. Price $7.50.

THE REVISED 8th edition of the electrical code handbook is based on the 1953 National Electric Code. Handbook numbers pertaining to code requirements are the same as in the code. Bold type is used to bring out explanations of various code stipulations throughout the book. Plant engineers as well as electricians can make good use of this publication.

Attention is given in the book to: wiring design and protection, wiring methods and materials, equipment of general use, special occupancies, special equipment and conditions, communication systems, and construction specifications. The book also contains a section which includes tables and diagrams in addition to examples putting code requirements into practice.

Job Study Techniques

JOB EVALUATION METHODS by Charles Walter Lytle. Size 9 by 6 in.; 507 pp; illustrated; cloth bound. Published by the Ronald Press Company, 15 E. 26th St., New York 10, N. Y. Price $7.50.

HERE IS a comprehensive reference book on procedures and techniques in job evaluation. In its preparation, the author made use of his consulting experience as well as information found in different industrial manuals bearing on job evaluation. The book pertains not only to plant jobs but also to office and executive positions.

In his analytical approach to job evaluation methods, the author presents the various phases in a step by step manner. He gives the reader a basis for patterning a job evaluation plan to his specific needs.

The volume gives attention to such subjects as job analysis and rating, merit rating and wage surveys, etc.

Reduce HOT WATER *Generation Costs...*

with the new

A.O.Smith Burkay "718"

HIGH RECOVERY WATER HEATER

Significant cost reduction in the heating of hot water for many plant needs can be made with the A. O. Smith Burkay System of Water Heating. A new addition to this famous line is the "718"—the water heater with "big job" capacity: 403 gallons per hour at 100-degree temperature rise, with an input rating of 420,000 BTU per hour!

By installing a "718" you can cut back the operation of your expensive boilers, reduce the size of your boilers; or in some cases dispense with them entirely . . . thereby reducing overhead, labor and maintenance costs. Furthermore, the large capacity of the "718" reduces the need for multiple heater connections.

For the plant restaurant, the Burkay "718" with the A. O. Smith patented Booster-Recovery System provides water at two temperatures simultaneously: 140 degrees for general-purpose needs and all of the 180-degree sanitizing rinse required by health authorities for the rinsing of dishes.

Packed with exclusive A. O. Smith design features that provide: all copper construction for clean, rust-free water; full combustion efficiency; accurately controlled water temperatures; instant response to hot water needs—this high recovery unit gives you *more hot water* at the *right temperature* for *less money* in *less time!*

Call the nearest A. O. Smith distributor for the full details; or write for Model "718" Specification Sheet.

"Plenty of Hot Water Pays All Ways"

Through research ...*a better way*

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City..... **Zone**.... **State**.....

For more facts circle 634 on Reply Card

Modernizing the Small Plant

(Continued from page 100)

accomplished by the time the plant re-opened.

It was necessary to unload all shelving, which had been in an unenclosed "stock-room" in the center of the plant, divide it into pieces of not more than four sections, and with the help of a lift truck and dolly to transfer it into a large room where it was re-assembled and re-stocked. Modern "bin lights" have since been installed in this completely separated room.

The Assembly Department and Flexible Shaft Department were the two sections in which production had to be stopped while moving. These departments lost the week following vacation shut-down, a time when delivery of machined parts to Assembly was below normal anyway. The Flexible Shaft Department was formerly on the second floor (now used for storage) and serviced by an elevator. Moving it to the ground floor simplified materials handling of rolls of wire and permitted of a much more ideal layout. The assistance of a rigging contractor was required to lower a few of the heavier machines.

The last major move was the large stock of electric motors. This storage area had been located about 200 ft from the shipping docks, and since motors are re-shipped in original cartons this long transfer was, in effect, twice eliminated by locating the storage area beside the shipping dock.

Material control and production scheduling, a vital function in any plant, is now even more critical at Walker-Turner. Scheduling of material must be integrated with production operations from the shipping dock all the way back to the receiving docks and even back to the supplier. Only by so doing can the fullest use and benefit be derived from improved layout and more efficient facilities.

Electrostatic Precipitators

(Continued from page 119)

Two-inch diameter sleeves are imbedded in the plant floor; they provide a quick and easy means of running utility connections from the access area to the production area. When the nine-inch reinforced concrete floors were poured, the sleeves were capped with two inches of concrete. Now, whenever new equipment has to be installed, utility lines are brought in merely by breaking this thin concrete layer.

Electric power, besides feeding through the floor sleeves, also flows through a grid of bus ducts imbedded in the floor. In areas where it is not necessary to uncap the sleeves, plug-in switches are used to tap power from bus ducts. Outlets are located every 12 in. Thus, the grid provides electric power anywhere in the plant.

Plant power is supplied initially at 12,470 v, and is brought into the metering and main breaker panels via underground cables. There are three substations, each having a high-voltage metal-clad air circuit breaker; air-cooled, dry-type transformers; and metal-clad, low-voltage switch-gear with drawout air circuit breakers. One 750-kva substation is located in an adjoining service building, and two others, each of 1,000 kva capacity, are in an access area under the main plant.

The plant uses current at a voltage of 480 v. Parker officials have found that the higher voltage enables them to use smaller motors on some production machinery. One 220-v, 5 hp unit, formerly used, for example, is about twice the size of the 480-v, 5-hp motor that replaced it. Also, with higher voltage, smaller size wiring is needed, and there is less voltage loss.

Much of the original plant investment of $4.5 million is returning dividends, thanks to the unusual design.

STOP RUST • STOP RUST

It's Hot·Dip Galvanized

TWO WAY PROTECTION. This installation of Hot-Dip Galvanized chain link fence will give you double protection. It will serve the primary job of protecting your property. Secondly, and a very important factor, is that once this fence is installed there will be no necessity for costly maintenance. It's Hot-Dip Galvanized to give you the utmost protection. This galvanizing is done *after* fabrication, thus avoiding the possibility of any part of the steel being exposed.

A thick, uniform coating means complete protection for you. Sealed in zinc, this fence will not rust.

When you have a rust problem, choose Hot-Dip Galvanizing, the best rust protection you can buy. For the best in galvanizing, send your products to a member of the American Hot Dip Galvanizers Association . . . he has the know-how to give you a top quality job.

Send today for our new booklet "Stop Rust." It gives you the full story on the process, plus a comprehensive coating comparison chart. "Must It Rust" 16 mm film available for showing.

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NOW...ANOTHER DRAVO FIRST IN INDUSTRIAL SPACE HEATING

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ON ALL PARTS WHICH ARE IN DIRECT CONTACT WITH FLAME OR FLUE GASES!

IN THOUSANDS OF INSTALLATIONS, users continuously report the exceptional stamina and long life of Dravo's stainless steel combustion chamber and heat exchange system. This outstanding record enables us to now guarantee long service life of these vital parts for maximum economy in your heating equipment investment. This bonded guarantee is backed not only by Dravo, but also by one of America's foremost bonding and guaranty companies.

ANOTHER EXAMPLE OF DRAVO LEADERSHIP, this bonded guarantee is further evidence of the continuing research and development work that has enabled Dravo to pioneer many industrial space heating equipment improvements. Some of these Dravo-introduced developments are: the floating stainless steel combustion chamber, four-pass combustion system, electronic flame control, U. L. approved design, burners scientifically designed for heater and many other advances to improve heater efficiency and longevity.

IF ECONOMY AND LONGEVITY ARE IMPORTANT TO YOU, why not investigate the heater that consistently leads the field in quality, efficiency, long life and economical operation? You can get complete information on Dravo Heaters by simply checking the coupon at right for the Btu range that covers your requirements—mail it today.

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Please send me complete information about the Dravo:

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- ☐ Gas Fired Unit Heater (68,000-180,000 Btu/hr. output)
- ☐ Please have a representative call at no obligation to me.

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ATTENTION PLANT ENGINEERS!

In considering rigid, unplasticized Polyvinyl Chloride pipe, valves, fittings or custom fabrications watch for these 4 important factors:

1 Is the product properly manufactured?
Boltaron 6200 is produced under rigid standards by the Bolta Division of The General Tire and Rubber Company.

2 Is it properly fabricated and designed?
Only well-trained, experienced engineers and fabricators are qualified to fill your individual needs. Every Boltaron fabricator in the United States and Canada is trained and licensed by Hartwell & Son.

3 Is the application right?
Unplasticized PVC is NOT a panacea for all industrial ills. It can and will perform with a high degree of satisfaction when properly applied to your specific problems.

4 Are the company and the product proven in use?
Hartwell & Son have been exclusive distributors of Boltaron for years. A list of their many successful installations in a wide range of industries can be supplied on request.

Boltaron 6200

With Boltaron 6200 you can obtain *from one source* a complete line of unplasticized PVC materials. Substantial inventories are kept at all times for prompt shipments. For further information write H. N. Hartwell & Son, Inc., Park Square Building, Boston, Mass., Box 113.

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B Molded Fittings
C Seamless Pipe
D Rod Stock
E Block Stock
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BULLETINS

(Begins on page 21)

158 Aluminum Casting Alloys—In addition to descriptive material on metallurgy and casting practices, the new "Aluminum Casting Alloys Handbook," consolidates for easy reference important specifications on aluminum casting alloys — Federal, Military, ASTM, SAE and others—cross-indexed. These pertain to sand and permanent mold castings, die castings, and ingots. Industry nomenclature and nominal compositions are given for wrought alloys. Heat treatment, corrosion, and effect of alloying elements are discussed. Also described are melting, fluxing and related problems. Federated Metals Div., American Smelting and Refining Co.

159 Welding Filler Materials—Available to plant engineers concerned with filler metals for welding is this colored chart in which each rod and electrode is identified by the metal for which it is suited, forms available and methods with which it is used. Products are listed by brand names, and for each product and form, the chart gives recommended welding methods and other information. Arcos Corp.

COOLING

160 Cooling Towers—Mechanical draft cooling towers for air conditioning and small industrial applications are described in this illustrated bulletin. Points out advantages, design and construction features, and includes capacity table and cross section drawing. J. F. Pritchard & Co.

161 Cooling Tower Fans—Bulletin A-111A, 8-pp, offers details on cooling tower and heat exchanger fans. Features include specifications and construction details on the tapered-blade design of plastic fans in 14- to 22-ft diameters and on a new line of plastic-impregnated wood fan blades. Hartzell Propeller Fan Co.

162 Heat Exchanger—Bulletin 124 shows how this company's Aero heat exchanger is applicable to controlled temperature cooling of water, oil and other liquids in a wide variety of industries—and with worthwhile cooling water savings. Niagara Blower Co.

WATER CONDITIONING

167 Status of Demineralizing—Six-pp Technical Reprint T-127, "The Status of Demineralizing in Today's Plants," discusses demineralization for boiler feedwater. It supplies helpful curves for estimating costs and performances of available systems, also flow diagrams of basic types of units and the results obtainable from each. Drawings of typical regeneration systems, cutaway view of an ion exchange unit, and a table of piping and fitting materials are included. Graver Water Conditioning Co.

168 Chemical Feeding System—The advantages of a systemized chemical feeding program for industrial water systems are discussed in this 6-pp folder. Examples of tube failures, plugged feed lines, and other troubles are given. Hall Laboratories.

169 Automatic Chlorinizer — Bulletin 840-K13 contains information on flow responsive or automatic proportional pacing of chlorine feeders. Photos and typical installation diagrams illustrate the text, which describes several automatic pacing systems for chlorine feeding problems. Builders-Providence, Inc.

170 For Economical Deaeration—Eight-pp Bulletin 1300 introduces manufacturer's "03," a deaerator designed to offer effective deaeration at a budget price. Explains reasons for deaeration of boiler water and tells how the "03" pays for itself in preventing boiler corrosion, providing added safety and other benefits. Discusses design and operation of these deaerators. Fred H. Schaub Engineering Co.

171 Steam-Jet Deaerator—Bulletin W-210-B-32, 8-pp, contains information on design improvements, ranges of application, performance characteristics, principles of operation and construction details for company's full-contact steam-jet deaerators. Cutaway views illustrate component parts and performance chart gives cc per liter of dissolved oxygen in effluent against per cent rated load. Worthington Corp.

172 Makeup Water Supplements — Supplementary treatments for boiler makeup water are discussed in Bulletin 28X8226. Points out that since no external treatment system produces complete removal of objectionable materials from the makeup and contamination usually exists in condensate, further chemical or supplementary treatment is advised. Allis-Chalmers Mfg. Co.

AMONG THIS MONTH'S NEW LITERATURE OF MERIT . . .

163 Filter Fabric Facts—This 16-pp illustrated booklet contains information about filtration principles; filtering devices; filter media; textile fibers for filtration; a comprehensive chart on chemical and heat resistance of cotton and synthetic fabrics; sections on yarns, fabric construction and finishing; and a round-up of filter fabrics in use. Photos illustrate variety of filter fabrics being produced for industrial use, and specifications for typical cotton filter and synthetic filter fabrics are included. Wellington Sears Co.

164 Guide to Magnet Wire—Catalog C-79-12A is a 120-pp pocket-size version of company's regular size magnet wire catalog. Exact in duplication of information, the catalog contains details on copper and aluminum wire products in all shapes and forms. The text is fully illustrated with charts, tables, drawings and photos. Anaconda Wire & Cable Co.

165 Steam Heating Refresher Course—"What You Should Know About Modern Steam Heating," 16 pp, is a concise source of information for evaluating steam as a heating medium, and to point up its characteristics and advantages. An outline for steam heat system specification is a checklist guide for specifying a heating system with steam; it covers 33 points from general conditions to final tests. Starting with a section on basic steam physics, booklet relates characteristics of steam to specific efficiencies and benefits. Covers types of buildings, equipment and heating requirements served economically by steam. Problems of heating control maintenance, repair are discussed. Steam Heating Manufacturers Ass'n.

166 Guide to Luminaires—Pocket-size, 28-pp Bulletin B-5799-B covers fluorescent luminaires for industrial and other use. Summarizes salient features of each type of luminaire as it discusses electrical characteristics, maintenance and mounting data, details of constructions, dimensions, and recommendations for application. Also contains a pictorial guide to floodlights and incandescent luminaires for industrial and other use. A 4-pp tabulation of buying data concentrates information needed for procurement. Westinghouse Electric Corp.

173 Carbides for Cutting—Selection of proper grade of cemented carbide for use as a cutting tool is the subject of 24-pp, pocket-size Bulletin Section 3-A. Points out that proper understanding of various grades of carbides for cutting metals, fibers, plastics, and rubber results in better finishes, greater accuracy and longer tool life. Issued as a supplement to section 3 of company's tool manual, booklet includes data for determining efficient cutting speeds for machining steel, cast iron and nonferrous materials, calculating machine horsepower, determining carbide grades by characteristics, and tables covering speed and grade suggestions. Carboloy Dept., General Electric Corp.

174 Power Transmission Machinery—Engineering Catalog D 55, 304 pp, covers speed reducers, V-belt drives, belts, sprockets, sheaves, chains, clutches, couplings, shafting, bearings, Taper-Lock bushings and other power transmission machinery. Besides providing sizes, ratings and necessary ordering information, this book offers helpful suggestions on the selection of equipment to meet job requirements, as well as tips on its use and maintenance. Includes tables giving weights and properties of shafting, trigonometric functions, strength and physical properties of materials, engineering formulas. Book is available to qualified plant engineers; please give job title when requesting it. Dodge Mfg. Corp.

To order these bulletins circle item numbers on the handy Reader Service Cards provided on the facing page.

INSTRUMENTS, CONTROLS

175 For Industrial Measurement — Design and operation of a line of stainless steel industrial meters for applications in the food, chemical, petro-chemical, pharmaceutical and processing fields are described in 12-pp Bulletin O.G. 406. Also described are two types of accessory equipment for use with meters: remote registration equipment for centralized batching and flow control; and multi-stage quantity control valves to eliminate hydraulic line shock. Meter and Valve Div., Rockwell Mfg. Co.

176 Mechanical Instruments—Circular M-2-B, 48 pp, describes and illustrates dial indicating thermometers, recorders, controllers, their accessories, and diaphragm motor valves. In this book, descriptive literature has been kept to a minimum with special emphasis given to basic engineering information and specifications. Weston Electrical Instrument Corp.

177 Temperature Controls—Eight-pp Catalog CC, on temperature controls and allied equipment for heating and refrigeration, provides information on recording, indicating, non-indicating controls; thermometers; bulb installation accessories; process timers, and gas pilots. Includes prices and references to detailed literature. The Partlow Corp.

178 Data on Charts—This 12-pp catalog outlines company's services in producing recording charts for standard and special instruments. It includes samples of both dial and roll type charts. The method of production of over 8000 different charts is outlined and technical information is given on requirements for special charts. Technical Charts, Inc.

179 Industrial Solenoids—Sixteen-pp Bulletin GEA-6215 describes company's line of industrial solenoids, featuring information on design, tests, and general application rules. Fully illustrated, the bulletin contains specifications, charts, and force and current curves. A cross-reference chart equates this new line with corresponding models in former line, and shows proper model to be chosen for requirements of force and stroke. General Electric Co.

180 Air, Hydraulic Devices—Factual information on this company's air and hydraulic cylinders, valves and packaged fluid power devices is given in this 14-section, 120-pp loose-leaf catalog and data book. Designed for easy up-dating as new products or modifications are announced. Contains full operating data. Pages are indexed. Modernair Corp.

181 Power Operators—Bulletin B-50-2, 12-pp, describes company's pneumatically positioned power operator for throttling control service. Illustrates versatility of the instrument and its many applications, including proportional control of speed changers, valves, pumps and electrical components. Conoflow Corp.

182 Hydraulic-Air Power Device—Sixteen-pp Bulletin 61763 gives application, specification, price and operating data on the Hydro-Air Power Unit. This is described as a piston-type device combining long stroke and fast action of the pneumatic cylinder with the positive action and powerful force-multiplication of the hydraulic cylinder. Bound in with the bulletin is a prize-winning paper from an applied hydraulics contest; this paper tells how the Hydro-Air Power Unit offers more speed, force and control. Pantex Mfg. Corp.

183 Bin Level Control—An improved heavy duty bin level control is described in Bulletin 11-0. Points out recent changes in design and construction and the resulting advantages in operation. Schematic drawings and specifications are also included. Stephens-Adamson Mfg. Co.

METAL FINISHING

184 Precision Cleaning, Finishing—Twenty-pp Bulletin 451-D, dealing with wet abrasive itself and mentions necessary equipment. Among

BULLETINS

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applications touched upon are extending tool life, producing decorative finishes, reducing glare on metals, preparing metal parts for anodizing. American Wheelabrator & Equipment Corp.

185 On Spray Pickling—"What You Should Know About Continuous Spray Pickling," is a 12-pp pocket-size booklet. Provides general information on spray pickling and discusses the pickling of drawn parts and preparation of steel for enamel. Metalwash Machinery Corp.

PUMPS, COMPRESSORS

187 Rotary Pumps—Eight-pp Catalog 955 covers briefly this company's line of pump products and explains and illustrates the operating principle utilized in the pumps. Gives construction features, mounting information and size and capacity data for the Series 3600 for handling liquids at slow speeds; the compact Series K for a veriety of services; the Series F for pumping clean liquids; and the new Series 1600 pump-motors. Geo. D. Roper Corp.

188 Centrifugal Pumps—Eight-pp Bulletin 105-B describes company's type O horizontal split case, double suction centrifugal pumps. Offers construction details and includes suggested specifications, a dimension chart and a selection table showing range of output and heads. Cutaway views with parts lists illustrate three types. Photos illustrate typical applications. Bulletin also describes briefly company's complete line of pumps. Aurora Pump Div., The New York Air Brake Co.

189 Rotary Pumps—Bulletin W-484-B2B describes company's rotary pumps with herringbone gears. Provides information on diversified applications, specifications and dimensions. An illustrated view of the pump is shown with a description of the component parts; a performance chart gives data on speed, capacity, pressure and power requirements of various pump sizes. Motor frame dimensions in relation to pump sizes are listed. Worthington Corp.

190 Centrifugal Pumps—Twelve-pp Bulletin 722.6 describes company's two-stage centrifugal pumps with horizontally split case and opposed impellers. Contains information on specifications, materials of construction, and mechanical details, and includes performance curves, and charts showing parts interchangability. Goulds Pumps, Inc.

191 Steam Jet Vacuum Pumps—High vacuum gas handling without moving parts is a feature of the single stage steam jet vacuum pumps described in 8-pp Bulletin 5-E. Discusses application, construction, and operation of the equipment, and includes performance data and sizing tables. Operating instructions are included as well as numerous applications of interest to chemical, food and allied processing industries. Schutte and Koerting Co.

192 High Vacuum Pumps — Catalog 400 describes company's mechanical booster high vacuum pumps. Points out advantages of two-stage construction, and illustrates characteristics in metallurgical vacuum processing, metallized coating, foundry research and pharmaceutical applications. A cutaway view is included, together with performance curves which show typical pumping speed, other data, horsepower vs. inlet pressure. Kinney Mfg. Div., The New York Air Brake Co.

193 On Vertical Pumps—This 16-pp bulletin describes and illustrates application of vertical industrial service pumps for liquid transfer from short settings in both industrial and process services. Points out advantages and describes three basic designs. Stresses versatility of the pumps due to design flexibility. Also gives general recommendations for obtaining optimum performance, and includes photos of typical installations. Peerless Pump Div., Food Machinery and Chemical Corp.

194 Horizontal Compressors—Bulletin 201-C, 20-pp, outlines advantages and applications for company's heavy duty horizontal single-stage compressors. Design and construction details are described through text and photos and full specifications are included. Pennsylvania Pump and Compressor Co.

195 Water Cooled Compressors — Eight-pp Form 1000A describes and pictures a line of water cooled air compressors. A keyed cutaway illustration shows main design features of these compressors, and dimensions, specifications are provided. Quincy Compressor Co.

REFRACTORIES

196 Boiler Refractories—Twenty-pp Bulletin R-36 is designed to provide an authoritative guide for selecting most efficient and economical refractories for boilers. Discusses importance of selecting proper refractory materials and requirements they must meet to avoid refractory failure. Typical uses of firebrick, insulating firebrick, castables, plastics and mortars, in both refractory-lined and water-cooled boilers, are described and pictured. Refractories Div., The Babcock & Wilcox Co.

197 Properties of Super Refractories—Latest data on physical and chemical properties of this company's super refractories are featured in this 24-pp booklet. Assembled in easy to find style, text is augmented by lists of applications, pertinent charts and tables. Detailed information on refractories of various compositions is presented, including characteristics and fields of applications. A chemical analysis table is included. The Carborundum Co.

MAINTENANCE

198 Safety Floor Maintenance — In "Mr. Higby and the Gremlin," 16 pp, is revealed the inside story behind slippery floor accidents. This entertainingly written booklet shows how to improve plant safety records while avoiding wasteful maintenance practices. Includes details on a line of safety floor cleaners, polishes, damp sweep products, anti-slip products, floor seals. Walter G. Legge Co., Inc.

199 Cleaning Problem Solutions—Illustrated Bulletin 154, 12 pp, presents information on a wide range of cleaning methods and shows

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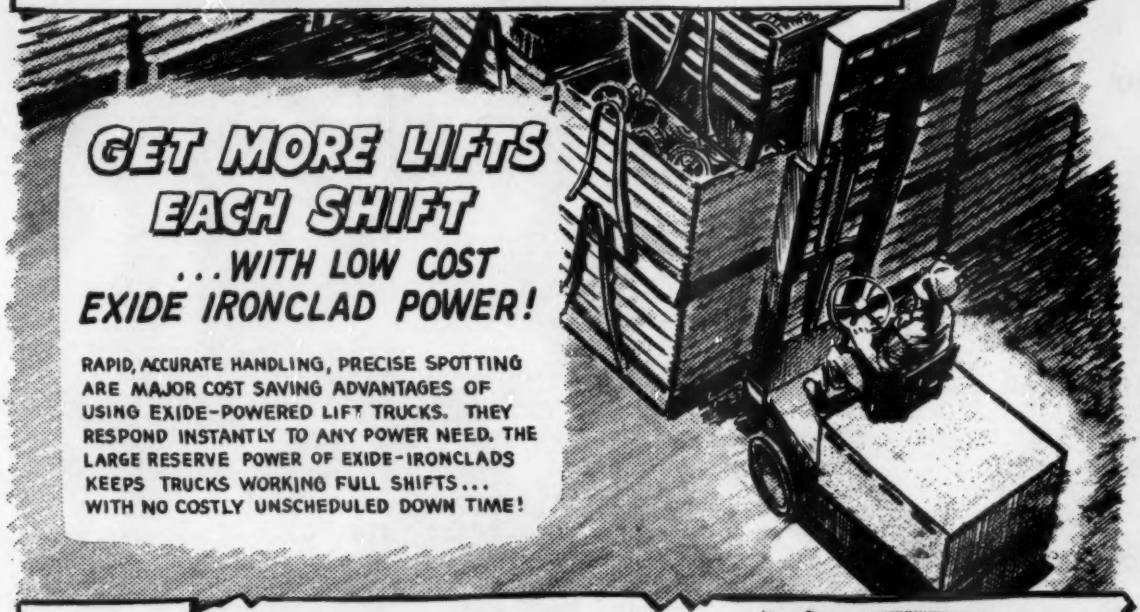

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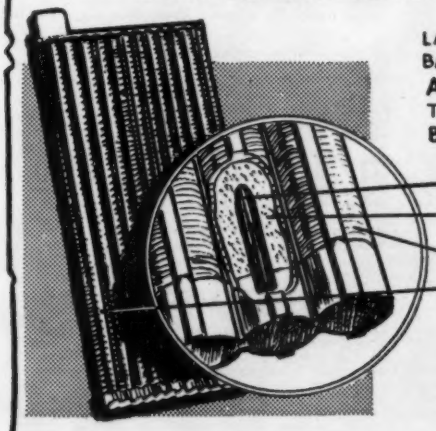

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BULLETINS

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equipment available. Special emphasis is placed on the stationary vacuum cleaning system and its long-run economy in many installations. Some attachments for extending the usefulness of this versatile cleaning system are pictured. The Spencer Turbine Co.

OTHER EQUIPMENT

200 **Locker Room Design File**—This 40-pp study covers design of changerooms with overhead locker baskets. Sets forth standards to be maintained in the toilet, shower, and locker rooms for maximum sanitation, efficiency and economy. Furnishes details and suggestions for laying out locker rooms with locker baskets, which elevate clothing to the ceiling where it is quickly dried and aerated. The Moore Co.

201 **Long-Lasting Lubricant**—Technical information and performance data on company's "41" grease, a silicone fluid-carbon black mixture for high temperature, slow speed bearings are provided in this 6-pp brochure. Presents illustrated case histories detailing savings in relubrication schedules, replacement and maintenance costs. Specifications and typical properties are also given. Dow Corning Corp.

202 **Epoxy Resin Compounds**—This 16-pp booklet describes the use of epoxy resins for tools, dies, jigs, fixtures, adhesives, laminating, casting, potting embedding, and encapsulating. A special section is appended on release agents for molds. Data on storage life and handling of the epoxy resin compounds, their working life, mixing, fillers and cleaning equipment are explained. Bakelite Co. Div., Union Carbide and Carbon Corp.

203 **Utility Blowers**—Dimensions, specifications, and performance data on non-overloading utility blowers with backward curved blades are presented in concise form in 48-pp Bulletin BC-11. Covers belt-drive and direct-drive models. Also company's Arrangement 2 utility blowers, and Arrangement 3 blowers available either single width, single inlet, or double width, double inlet. Hartzell Propeller Fan Co.

204 **Air Ejectors**—This 12-pp newly-revised booklet describes steam jet air ejectors for efficient, low cost air removal from condensers. Illustrated with photos and drawings, it explains ejectors' principle of operation and their classification according to stages and elements. Discusses inter-after condensers, steam jets for special services, air ejector accessories. An engineering data section covers method of determining requirements. Condenser Service and Engineering Co., Inc.

205 **O-Rings for Sealing, Gasketing**—Catalog AD-148, 18-pp, describes company's O-rings for sealing and static gasketing. Gives design information, recommended pressures, and available materials for both dynamic and static applications. Also lists standard O-Ring sizes. The Garlock Packing Co.

206 **Standard Line Blinds**—Now available is a 12-pp catalog giving standard dimensions and specifications for Micro-Blanks, a standard series of line blinds. From this catalog a plant engineer can select line blinds to meet job requirements and order them by code number. N. M. Aitken Co.

207 **Fabrication of Tanks**—Catalog 554, 48-pp, describes facilities and workscope of company's fabricating plant—offering latest techniques in custom fabrication of steel and alloy plate. Particularly useful for reference purposes are the comprehensive corrosion data tables for various metals. They list the corrosive action of 200 different chemicals in various concentration forms on 14 different metals. Nooter Corp.

208 **Equipment Installations** — This handsomely illustrated 36-pp book describes many recent mechanical installations of equipment. They include steel mills, other metal industries, generating stations, dams, paper mills, and cover such equipment as cranes, milling equipment, electrical rotating machinery, pumps, as well as structural steel buildings. Also pictured are some king-sized moving projects handled by this company, including the relocating of blast furnaces. Eichleay Corp.

DATA FILE of literature for the plant engineer's library

STANDARD CATALOGS, bulletins and handbooks are listed to help plant engineers maintain a permanent data file. To get these free catalogs, circle item numbers of those wanted on postage-free cards provided for you on page 199-200.

INSTRUMENTS, CONTROLS

301 **Flow Meters** — Catalog 2320, 58 pp, fully illustrated, describes all types of manufacturer's flow meters, including indicating, recording, integrating and controlling instruments of evenly graduated and square root types, as well as area meters and differential converters. Includes tables on flow approximations, installation information, factors necessary to determine if fluid to be measured can be properly handled. Industrial Div., Minneapolis-Honeywell Regulator Co.

302 **Orifice Meters** — Bulletin 1050 Rev. 1, 28 pp, shows how manufacturer's orifice meters are made, how they operate. Tables give capacity data, and there are descriptions of manifold arrangements and differential ranges, along with illustrations of various parts. Sketches show how meters are used. Rockwell Mfg. Co.

303 **Industrial Thermometers** — Fourteen-pp Catalog 101 describes and pictures company's Gotham line of thermometers, including the Multi-Angle which can be rotated and tilted to practically any position. Includes temperature equivalent table. U. S. Gauge Div., American Machine and Metals, Inc.

304 **For Industrial Metering**—Practical selection and application data on meters for industrial liquids are provided in 20-pp Form 566. Explains value of metering in batch mixing, process and cost control. Illustrated charts show how to select proper meter according to type, temperature and flow rate of liquid to be metered, and include specifications for models shown. Strainers, valves and other accessories are described. Neptune Meter Co.

305 **For Liquids Worth Storing**—Bulletin 6405 offers an illustrated discussion of company's self-contained gages for liquid level applications, covering both direct- and remote-reading types, also a dial type hydrostatic gage. Stresses value of measuring stored liquids. Liquidometer Corp.

306 **Refrigeration Controls**—Bulletin 109 describes the application of mercury-bulb instrumentation down to —30 F. Instruments presented cover conditions normal to food and drug processing, petro-chemistry, air conditioning, baking, etc.; include indicating, non-indicating, recording types. The Partlow Corp.

307 **Wide Range Regulator** — Featured in Bulletin 316 is an expansion stem type temperature regulator operated by water or compressed air. Explains how regulator works. The Powers Regulator Co.

MECHANICAL POWER TRANSMISSION

308 **Power Transmission Equipment**—Form 118, 24 pp, gives descriptive and technical information on variable speed pulleys, wide V-belts, sheaves, motor bases, countershafts, and Select-O-Speed transmissions. Illustrated with photos and dimensional drawings, booklet provides ratings, sizes, application and installation tips. Lovejoy Flexible Coupling Co.

309 **Improved Transmission**—Bulletin 3270 describes the Plan-Gear, a compound planetary type transmission said to be as simple to operate as an electric motor and offering full speed forward to full speed reverse in 1½ sec. Illustrated with photos and dimensional drawing of the unit, explains how it is controlled by hydraulic pressure. Suggested uses are given. American Gear & Mfg. Co.

310 **Adjustable V-Belt** — This 8-pp catalog covers company's new Veelos TD and TE V-belt designed to reduce installation and operation costs on big drives. Studs, cup-washers and T-screws of the belt are illustrated, and installation and operation characteristics explained. Booklet includes directions on how to measure, to couple and uncouple, and to install. A table shows correct lengths for these belts. Manheim Mfg. & Belting Co.

311 **Flexible Couplings** — Condensed Engineering Catalog 51-A contains excellent data on the choice and use of company's flexible metal couplings. Tells advantages of these couplings and discusses design principles. Double-flexing and floating shaft types, light duty couplings and types for special applications are described and pictured in detail. Thomas Flexible Coupling Co.

312 **Improved V-Belts**—This literature on company's Vulco rope drives explains how this rope with concave sides is designed to fill out to a precise fit in the sheave groove, to provide less wear, more pulley contact and more sure power when needed. The Gates Rubber Co.

313 **Roller Chains, Sprockets**—Catalog 754, 64 pp, describes, illustrates a line of roller chain stock sprockets, including minimum Lore sprockets for reboring, also finished bore and Taper-lock bushed sprockets which are ready to use. Tables show speed ratios for sprocket combinations, standard keyways and setscrews. Includes chain selection and application data, installation and lubrication recommendations, chain length calculations, dimensions and price lists for single and multiple strand roller chains. Diamond Chain Co.

314 **Sprockets, Roller Chain**—Bulletin A-624 24 pp, is compiled to provide plant engineers with all data required for selecting and ordering roller chain and sprockets. A page devoted to Taper-Lock sprockets for each size of chain from 40 to 100, giving sectional drawing, dimensions, number of teeth, maximum stock bore available, weights, prices and other data. Another page covers Taper Lock bushings; and full information is given on riveted and cotter-type roller chains. Dodge Mfg. Co.

VENTILATING AND AIR CONDITIONING

315 **Ventilating Equipment**—A 36-pp guide to selection of propeller fan type ventilating equipment, Catalog 151 includes specifications and installation data on company's propeller fans in portable, tubeaxial, centrifugal, roof ventilator and other types. Detailed illustrations of construction features accent design and performance factors. Case study photos show installations. Ilg Electric Ventilating Co.

316 **How Conditioning Units Can Help**—The advantages of self-contained units in cooling, dehumidifying, cleaning are cited in 40-pp Catalog 1307. Explains installation, operation. Provides data on direct expansion and cold water cooling and on hot water and steam heating. Clarage Fan Co.

317 **Air Conditioning Filters**—Bulletin 600, 8 pp, describes company's Staynew ventilation and air conditioning filters. Specifications, engineering, performance and installation data covering dry type panel filters, for the removal of air-borne impurities given. Dollinger Corp.

DUST CONTROL

318 **Manual of Exhaust Hood Design**—Bulletin 270-E1, 24 pp, features engineering data on dust control systems for the metal working industries. Illustrates and discusses the design of exhaust hoods for many operations in this field. Also, 61 photos of dust control installations show various methods of hooding dust source. American Air Filter Co., Inc.

319 **Dust Control Blast Cleaning** — Bulletin Cleaning 1210, 24 pp, fully illustrated, describes manufacturer's line of blast cleaning and dust control equipment, accessories. It is indexed according to equipment, type and purpose. Lists three methods of abrasive application. Pangborn Corp.

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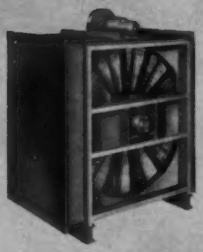

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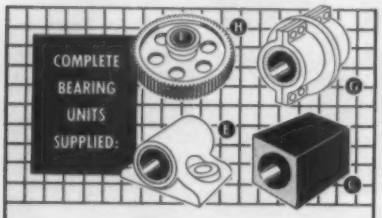

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(Begins on page 204)

320 **Improved Dust Filters**—Sixteen-pp Bulletin 528-R gives information on continuous-automatic dust filters available housed or unhoused for use on pressure or vacuum. Explains principle of cleaning the filter cloth with high pressure reverse jet air, and tells where these filters are being used. Provides comparative test data on these and other type filters; discusses industrial dust control service offered and diagrams some installations. Self-adjusting blow rings furnished with these filters are described in detail. The Day Co.

HEATING, HEATERS

321 **Forced Air Space Heaters**—Illustrated bulletin 523-B, 12 pp, is devoted to a line of forced air heaters for comfort heating, year-round ventilating, tempering make-up air, process drying and heat curing. Explains design efficiency, construction details, operating principles and flexibility of application. Advantages of the heater are detailed. Dravo Corp.

322 **Buying a Portable Heater**—Stressing safety factors involved, this 40-pp booklet, "Guide to the Selection and Use of Portable Space Heaters," analyzes temporary heating equipment from standpoints of personnel well-being, property protection and fire and accident prevention. Classifies basic types of direct-, indirect-fire heating devices. Herman Nelson Div., American Air Filter Co., Inc.

323 **Plumbing, Heating Supplies**—Edition G is the current edition of this company's 118-pp general catalog on plumbing and heating repair parts, tools and accessories. Indexed and generously illustrated; gives sizes, intended uses and ordering data. J. A. Sexauer Mfg. Co., Inc.

324 **Unit Heaters**—Bulletin 7517, 48 pp, presents full information on latest design of this company's Venturafin unit heaters for steam or hot water applications. Gives features of construction, general engineering data, capacity tables. Fully illustrated with photos of horizontal and vertical models, dimensional drawings and piping diagrams, booklet includes tips on the use and selection of unit heaters. American Blower Corp.

325 **What Unit Heaters Can Do**—Featuring many photos showing how unit heaters are being used to provide heating comfort, cut fuel costs, provide economical air circulation, 8-pp Bulletin 149-A discusses their advantages, gives performance data. Modine Mfg. Co.

The two Reader Service Cards on pages 199-200 are easy to use and need no postage. Just circle the item number of catalogs wanted.

326 **Hot Water for Industry**—An excellent engineering data booklet, "Hot Water for Industrial Plants," is a compilation of literature covering use of water heaters for process needs, cafeterias, lavatories, wash fountains, laboratories. Discusses hot water requirements for these applications; describes and illustrates heaters, recovery systems, booster units applicable; provides installation suggestions and operating instructions. Available to qualified plant engineers, please state your title. A. O. Smith Corp.

327 **Gas Heaters**—How, why and when to use gas-fired unit heaters is outlined in pocket-sized Bulletin SA-541-A, 20 pp. Includes hints on heater selection and installation, schematic diagram explaining how water works, instructions for estimating heat loss and computing gas requirements. Reznor Mfg. Co.

328 **Electric Heat, 101 Ways**—Principal industrial heating applications and methods are described in, "101 Ways to Apply Electric Heat," a 32-pp booklet. Illustrated case his-

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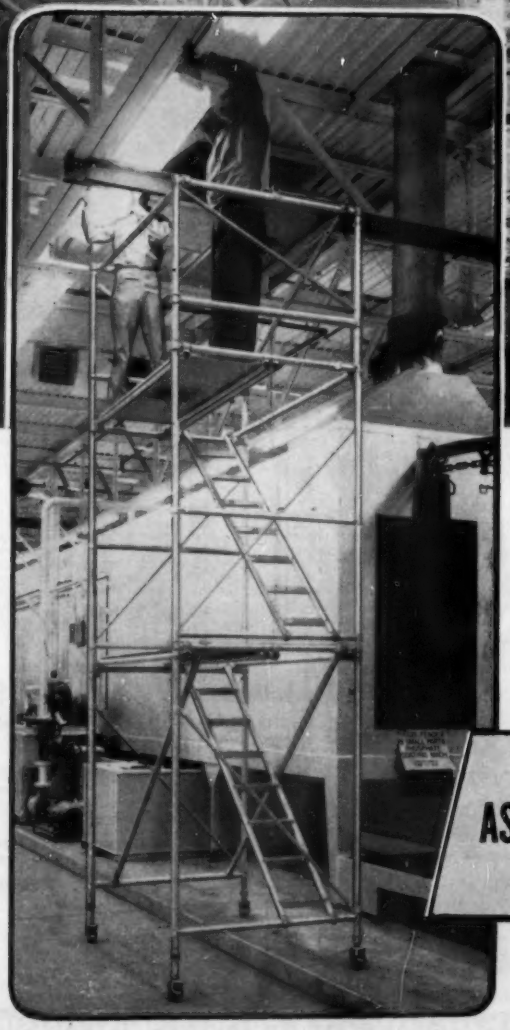

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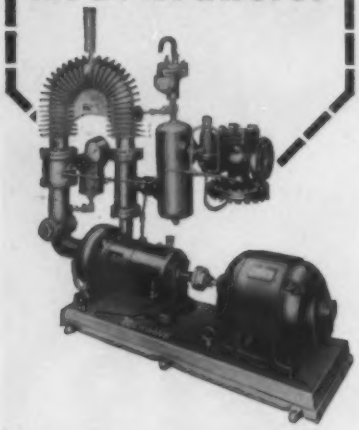

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(Begins on page 204)

tories show how metal-sheathed electric heating units are being used. Physical aspects of installation are detailed along with a discussion of the problem, solution and advantages obtained. To illustrate liquid heating, diagrams and photos show heat applications for the elements and heaters. Similar treatment is accorded problems of heating air and gases; melting soft metals and viscous materials; and heating machinery and equipment parts. A section is devoted to far-infrared heating. Edwin L. Wiegand Co.

VALVES, TRAPS, PIPING AND ACCESSORIES

330 Relief Valves—Twenty-pp Publication 5200 is replete with data on company's multiport relief valves for steam, air and gas service. Charts, diagrams, tables and examples of plant operating conditions serve to show how to select a relief valve. Text and illustrations show advantage of these valves over other relief valves, and booklet also shows how the multiport relief valve can be used as a differential pressure spillover valve or a check valve in closed systems. Cochrane Corp.

331 Choosing the Right Valve—Presenting valve selection as a matter of matching the valve's service characteristics with the service requirements of the job, this practical 20-pp booklet explains and illustrates basic design features of gate, globe and check valves. It tells in nontechnical language, how each of these valve types works, and where it is best suited for use. Disc, stem connection, bonnet and bonnet-joint characteristics are also discussed and the importance of stem operation is treated. A final chapter is devoted to common materials of valve construction. Crane Co.

332 Valves and Fittings—Illustrated Catalog 47 provides over 60 pp of ordering information and application data on valves and fittings made of stainless steel and other corrosion resistant alloys designed for use where corrosion or contamination are factors. Gate, globe, and angle valves for a wide range of services are presented, also needle valves, sampling valves, screwed and flanged fittings. Design and construction details are shown. Also included is a chart of first and second recommendation of alloys for corrosive media. Alloy Steel Products Co., Inc.

333 Pressure Reducing Valve—Bulletin 228, 8 pp, describes and pictures a pilot-operated pressure reducing valve for automatic control of reduced pressure required in steam service. Gives advantages of the valve, illustrates method of installation. McAlear Mfg. Co.

334 Plastic Pipe Valves—This 6-pp bulletin describes tough, corrosion-resistant Dur-Ace plastic pipe fittings and valves. Gives properties of Dur-Ace and includes table showing resistance to more than a hundred chemicals. Standard sizes and pressures of pipe are given, also sizes, weights, prices on pipe and fittings, diaphragm valves. American Hard Rubber Co.

335 For Quick Valve Selection—Here's a 20-pp catalog digest providing ordering and application information on gate, globe, angle and check valves in bronze, iron, cast and forged steel construction, also valve accessories and parts. Illustrated, includes pressure-temperature chart. The Ohio Injector Co.

336 PVC Valves, Fittings—Circular 601 describes Luncor all-molded polyvinyl chloride valves and fittings. Stresses corrosion resistance of these valves, lists some industrial fluids they handle. A large cutaway illustration shows design details of the valve. Also included are dimensions. The Lunkenheimer Co.

337 Steam Trap Solutions—Bulletin F.151, 36 pp, is the newest edition of this company's well known booklet, "Solving Steam Trap Problems." Organized for easy reference, this illustrated booklet provides specifications and capacities of steam and float traps, air release valves, pipe line strainers. Tells how to calculate condensation loads and select traps for unit heaters, jacketed kettles, submerged surfaces. Gives pointers in installing and servicing traps. Also included in this edition is information on combination float and thermostatic traps. The V. D. Anderson Co.

338 Steam Trap Book—Catalog J, 44 pp, includes physical data and prices on cast semi-steel and forged steel inverted bucket steam traps, compound steam traps and ball float air and air relief traps; a handbook section explaining how to calculate condensate loads and select traps for all classes of equipment; a maintenance section. Armstrong Machine Works.

339 Steam Trap Reference Manual—Bulletin T-1740, 24 pp, tells why and where steam traps should be used; explains desirable trap features. Advantages of company's impulse steam traps are described, their operation illustrated. How to figure trap sizes and how to size condensate return lines are told and capacity and pipe dimension charts and thermodynamic properties of saturated steam included. Yarnall-Waring Co.

340 Steam, Air and Gasoline Traps—Catalog 751, 32 pp, is a recently issued trap ordering book with capacity tables, installation diagrams, and containing charts and formulas for determining proper size trap for specific applications. Covers thermostatic steam traps, expansion steam traps, weight-operated traps for steam, air, gasoline, pressures up to 1500 lb; separators. W. H. Nicholson & Co.

341 Unions, Check Valves—Illustrated Catalog 55, 24 pp, describes and provides ordering information on a line of forged steel unions and check valves. Socket-weld, high-speed, orifice, O-ring and other unions are included. Catalog provides service recommendations, dimensions and list prices. Also included is table covering discharge of water to atmosphere. Clayton Mark & Co.

342 Packless Expansion Joints—Bulletin 35-51A offers 28 pp of up-to-date information on company's Corruflex joints, their design and installation and advantages over other means of providing for thermal expansion in pipelines. Construction features are explained and illustrated; simplified selection data include

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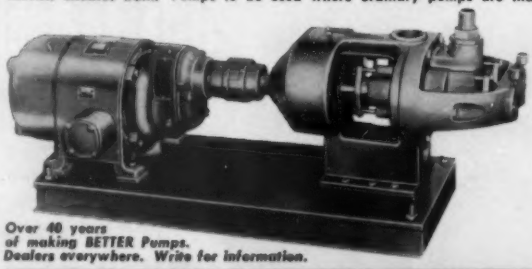

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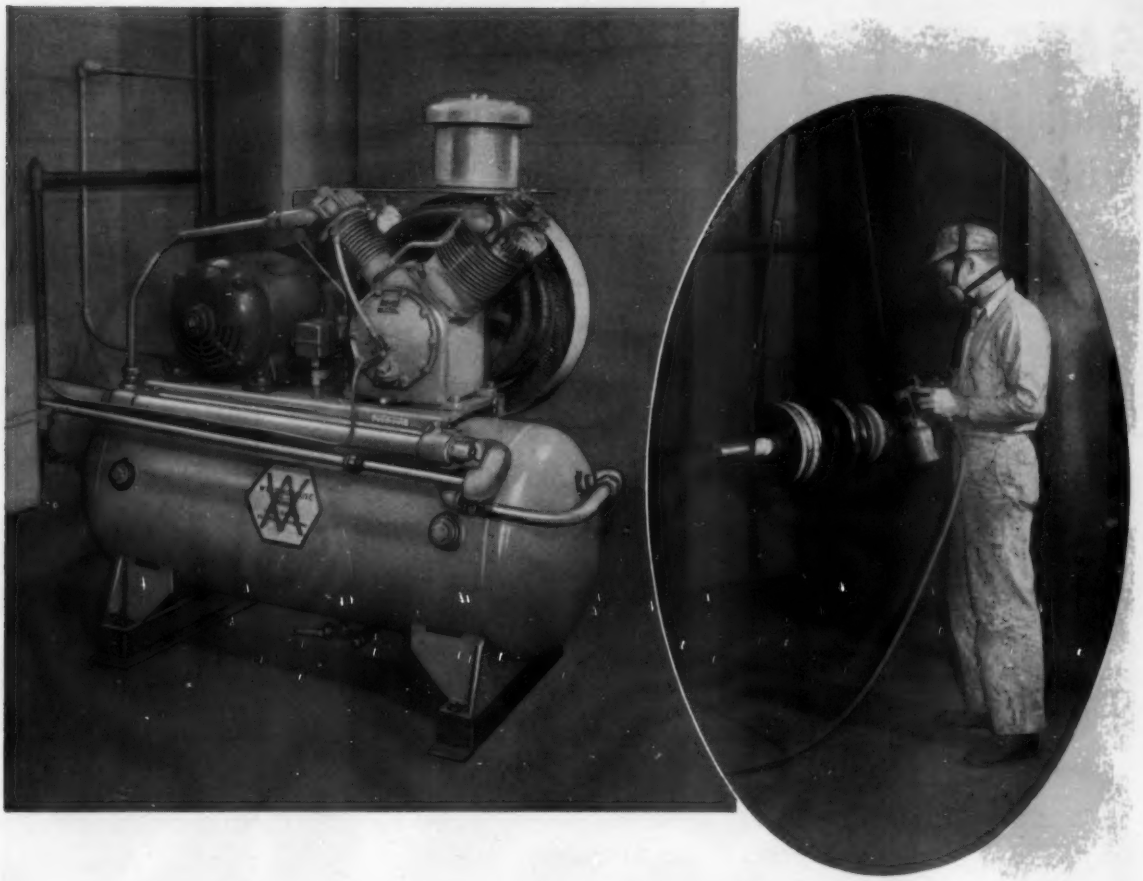

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(Begins on page 204)

tables for determining amount of expansion in pipelines. American District Steam Co., Inc.

343 **Unions and Fittings**—Twelve-pp Catalog 50 covers manufacturer's line of unions of all types, elbows, tees, fittings. Dart Union Co.

344 **Welded Fittings**—Catalog 3 is a 36-pp ordering and engineering reference book on company's Weldolets for piping services. Gives data on butt-welding and socket welding Weldolets as well as on Thredolets for making threaded outlets. Typical installations are pictured; sizes, weights and prices provided. Also included are installation instructions and a technical section. Bonney Forge & Tool Works.

INSULATION

345 **Flexible Duct Insulation**—Form F-180 describes and gives product specifications for fiber glass flexible duct insulation. Advantages are cited, and easy installation procedure is illustrated. Also included are data on thermal insulating and acoustical insulating qualities. Fiber Glass Div., Pittsburgh Plate Glass Co.

346 **Pipe Insulation**—Bulletin F 1-100 features on-the-job installation photographs of cellular glass insulation for pipe temperatures between —300 and 800 F. Complete listing of physical properties, condensed specifications are given. Pittsburgh Corning Corp.

347 **Insulating Material** — Ultrafine, a new thermal and acoustical insulation made of blown glass fibers, is the subject of this bulletin. Complete with photos of insulation in use and tables showing its efficiency, gives physical properties, principal uses, handling characteristics, thermal conductivity, and acoustical efficiency. Gustin-Bacon Mfg. Co.

348 **One-Coat Insulation**—This 32-pp booklet describes company's Type D insulation, a sprayed-on coating for surfaces with temperature range from —40 to 300 F. Tells how one application of this coating not only insulates but also waterproofs, rustproofs, deadens sound, prevents condensation and resists fire. Insul-Mastic Corp. of America.

PUMPS, COMPRESSORS

349 **Installing a Pump** — Blaming many pump operating troubles on improper pump selection and installation, this 8-pp technical article tells what should be taken into consideration when ordering a pump. Titled "Studying the Installation," it discusses head, viscosity, pipe friction, suction lifts, horsepower and materials. Illustrated. Viking Pump Co.

350 **Circulating and Coolant Pump**—Form 7074-D, 20-pp, shows a line of Motorpumps with totally enclosed motors. Arranged for easy selection, a pictorial index helps to locate pages describing size and type of pump desired. Data provided includes performance curves, cross-sections, dimensions, descriptive material for each particular pump class. Horizontal and vertical units are described in fractional and integral horsepower sizes, as are cradle and flange mounted units meeting JIC standards. Ingersoll-Rand Co.

351 **Vertical Pumps**—Bulletin B-1700, 12-pp, presents four features which distinguish close coupled vertical pumps and suggest their use in transfer of process liquids and water—flexibility of construction; adaptability to pumping system's present available NPSH; space saving design; and availability in both transfer-type and process-type construction. Includes many diagrams and full specifications. Peerless Pump Div., Food Machinery and Chemical Corp.

352 **Screw Pumps** — Described and illustrated in 6-pp Bulletin WQ-S206 are screw pumps of the double external bearing and gear type and the double external bearing and gear hopper type. Bulletin gives design details, application suggestions, and dimensional data. Warren Steam Pump Co., Inc.

353 **Rotary Pumps**—This bulletin gives information and volumetric displacement speci-

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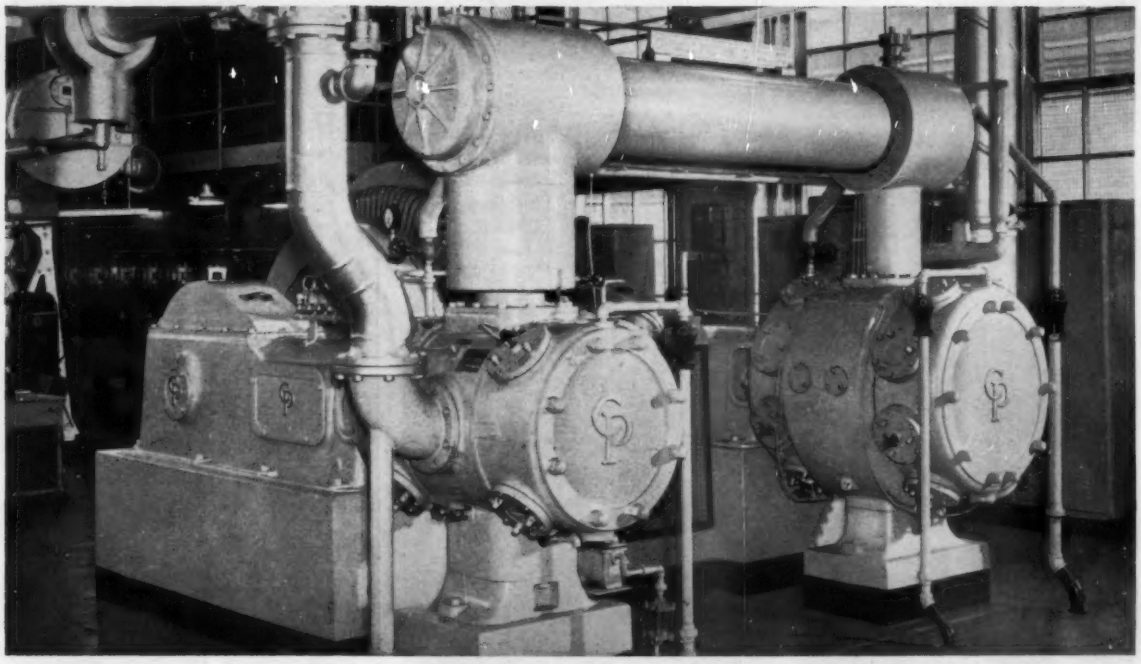

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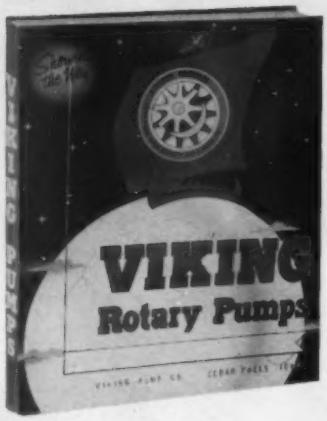

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DATA FILE

(Begins on page 204)

fications for heavy duty industrial pumps for tough applications, including handling paints, acids, hot varnish, paper pulp, most abrasive slurries, solventa, plastics, oils, etc. Bump Pump Co.

354 **Sump Pump Selector** — Bulletin 54-3-1420, 20 pp, provides a selection table allowing a plant engineer to choose any of the 4000 models of the BJ Sumpmaster pumps, which range from 10 to 2600 GPM with heads from 20 to 300 ft. Includes complete dimensions and outline drawings, simple coding system for ordering. Byron Jackson Co.

355 **Compressors** — Bulletin A72, 36 pp, gives construction, operation information on company's Class WN-114 heavy-duty air compressors. Illustrates seven models of compressor as a single unit for displacement capacities from 1186 to 1948 cfm, twin units furnishing up to 3896 cfm. Joy Mfg. Co.

356 **Gas-Engine Driven Compressors**—A new two-cycle turbocharged compressor is described in 24-pp Bulletin 134. Stresses economy of installation and operation afforded by this gas-engine driven unit, lists other advantages. Explains how turbocharging saves on fuel and cooling. Design and construction features of this new model are discussed and illustrated in detail; and dimensions and specifications are provided. Clark Bros. Co.

357 **Air Compressor Selection Data**—Factors to be considered in selecting a compressor are discussed and selector charts provided in 20-pp Bulletin IDC 9302-3, covering manufacturer's Y and G air compressors. The Y line includes tank mounted and bedplate units, single- and two-stage types. Special features of each model are described, dimensions and ratings given. Westinghouse Air Brake Co.

PACKINGS, GASKETS, SEALS

358 **Packings and Gaskets**—In this 40-pp belting and packing manual (NY-2697-P) are helpful charts plus information on the care, use and maintenance of rod and sheet packings and gaskets. A complete engineering section contains all necessary charts and tables for determining working specifications of packings. Also included are packing recommendation charts. New York Belting and Packing Co.

359 **Buyer's Guide on Packing**—Twenty-pp Catalog PC-101 brings together all material on company's Palmetto packings and includes data on packing for liquid pistons on inside-packed piston pumps. Greene, Tweed & Co.

360 **Packings for Chemicals**—Dura Plastic Teflon packing for sealing applications in the handling of corrosive chemicals is introduced in Bulletin 461 M. D. Stresses heat resistance of the material, chemical inertness. Discusses construction details and lists packings for use with specific chemicals. Durametallic Corp.

361 **Braided Packing**—Illustrated 8-pp Bulletin A-131 describes manufacturer's Lattice Braid rod and shaft packings. Points out construction features, and discusses available materials, sizes and forms. Also contains service reports from users, and includes service recommendations. The Garlock Packing Co.

362 **Metallic Packing** — This folder is devoted to company's elastic metallic packaging intended for frictionless operation by means of an oil seal. Photos and text tell how seal is constructed, used. A. W. Chesterton Co.

ELECTRICAL EQUIPMENT

364 **Variable Speed Motors**—Sixteen-pp Bulletin 1797, revised, outlines many reasons why variable speed motors can be used to improve production, and it includes illustrations of all types of company's Varidrive motors, as well as their mechanical features, remote controls; etc. U. S. Electrical Motors, Inc.

365 **Heavy Duty FHP Motors**—Features and performance characteristics of unidirectional

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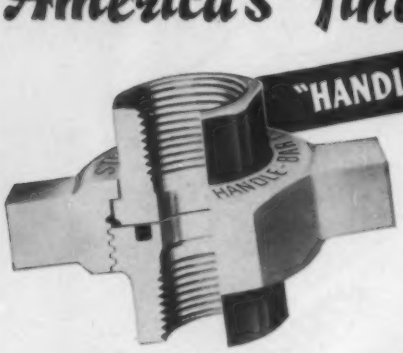

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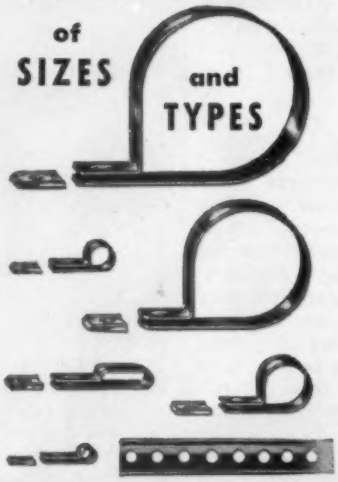

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DATA FILE

(Begins on page 204)

motors in ratings up of 1/20 hp are presented in Bulletin F 3959-2. Specifications, dimensions and performance curves are provided. Barber-Colman Co.

366 **Polyphase Motors**—Bulletin 103 provides design features of company's Loadstar polyphase motors conforming to new NEMA standards and also gives tabulated information on the changeover. Open drip-proof and totally enclosed fan cooled motors are covered. Photos show construction details. Leland Electric Co.

367 **FHP Manual Starters**—Bulletin 224 is a folder giving the features and ratings of a line of fractional horsepower manual starters. Lists applications for them and pictures enclosures. Square D Co.

368 **Motor Starters**—Booklet 1062, 16 pp, describes motor starters having short circuit protection for 2200- to 5000-v systems. Illustrates starters using company's 50,000 kva interrupting capacity type HS contactor; also starters which will safely interrupt the circuit from a bus of unlimited capacity. Indoor and outdoor installations are pictured. The Electric Controller & Mfg. Co.

369 **Toggle Switch**—Catalog 73a, 12 pp, covers 17 precision snap-action toggle assemblies and more than 90 AN and JAN approved designs, including assemblies that will control from 1 to 24 separate electrical circuits. Contains dimensions, operating characteristics, electrical ratings, contact arrangements on each switch, and an illustration of one representative switch from each group of switches. Gives general information on each "family" of switches, which are designed for low voltage d-c applications. Micro Switch Div., Minneapolis-Honeywell Regulator Co.

370 **What You Should Know About Circuit Breakers**—Sixteen-pp Manual 101 explains operating principles of basic circuit breaker designs and provides engineering data on factors of application. Includes simplified diagrams of three basic types. Illustrates with colored charts and diagrams, explains temperature factors, inrush current effects, tripping and reset time. Heinemann Electric Co.

371 **Switch Wiring Diagrams**—Bulletin 709 is a 36-pp booklet of typical wiring diagrams for across-the-line starting switches. Indexed and arranged for easy use, this booklet serves as a guide to some of the many ways in which this company's manual and magnetic across-the-line starters can be applied. Some of the diagrams incorporate more than one useful feature. Includes key to electrical symbols used. Allen-Bradley Co.

372 **Trolley Busway Systems**—Three new bulletins offer real help on electrical installations involving cranes and hoists, assembly and production lines, moving test lines and other moving electrical equipment. Bulletin 35 (28 pp) covers 225-500 amp systems; Bulletin 40 (44 pp) 100 amp systems; Bulletin 45 (40 pp) 60 amp systems. Each includes special sections on installation planning and procedure, methods of mounting and equipment descriptions. Feedrail Corp.

373 **The Answers on Wiring**—"20 Questions and 20 Answers on Safety m.i. Wiring" describes and illustrates characteristics and advantages of this new wiring system. A complete table of types, sizes, weights, and lengths, as well as a partial list of users included. General Cable Corp.

374 **Power and Control Cables**—Sixty-pp Catalog 24 describes typical power and control cable designs and is intended as a guide in selecting proper wire and cable type. Describes insulations, sheaths and coverings, electrostatic shielding, and includes product data on all types listed. Rome Cable Corp.

375 **Productive Maintenance** — Publication GED-1691 is a pocket-size 104-pp source of information of value to plant engineers who want to get more production from their present motors, generators and control equipment. Besides general maintenance suggestions, the booklet contains trouble shooting charts and recommended renewal parts guides. Also provides wire and cable data and includes a section of

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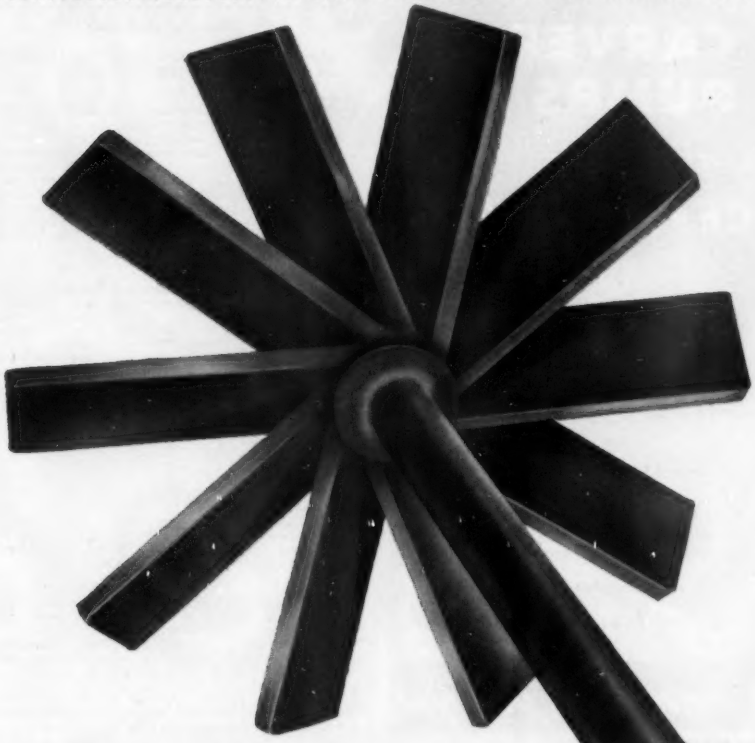

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(Installation by Castle Rubber Company, Butler, Pa.)

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(Installation by Detroit Rubber Company, Detroit, Michigan)

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(Installation by Electro-Chemical Engineering and Manufacturing Co., Emmaus, Pa.)

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DATA FILE

(Begins on page 204)

formulas and other data pertaining to motors and generators. General Electric Co.

376 **Battery Maintenance Tips**—Form 5063 is an 8-pp pocket-size booklet on storage battery maintenance which breaks down battery care to seven basic rules, each emphasized by cartoon treatment and brief text. Booklet is suited for distribution to maintenance personnel as well as to those indirectly associated with batteries, such as purchasing department personnel. Includes suggested maintenance chart forms. Exide Industrial Div., The Electric Storage Battery Co.

377 **Handbook on Storage Batteries**—This 64-pp booklet of instructions and technical data is the sixth edition of this company's battery service manual. Provides a brief treatise on the theory of the lead-acid battery. Gives detailed instruction on the care and operation of batteries, on maintenance and repairs, and on standard and special parts. Booklet is of special value to plant engineers concerned with storage batteries for cycle service in industrial trucks and materials handling equipment. Gould-National Batteries, Inc.

378 **Batteries for Control Switchgear**—This company's PlastiCal (lead calcium) and Plasti-Cell (high-tensile alloy grid) batteries for control, switchgear, and auxiliary power are described as to design, application and performance in Bulletins CP-536 and CP-537. Specifications, dimensions given. C & D Batteries, Inc.

379 **Regulated Power Equipment** — Catalog 254, 32 pp, covers company's line of electronic a-c voltage regulators, regulated d-c sources and B supplies, electronic frequency changers, inverters, magnetic-amplifier d-c sources, and related equipment. Besides giving general information on the operating principles of these instruments, booklet explains reasons for regulating line voltage and advantages of electronic regulations. Sorensen & Co., Inc.

LIGHTING, COMMUNICATION

380 **Selection Data on Lighting Fixture Hangers**—Catalog 50, 80 pp, contains general and detailed information on disconnecting and lowering lighting fixture hangers, accessories, special devices and parts. Utilizes 247 photos and drawings to show construction principles, operating features, installations, modifications and component parts for both indoor and outdoor units. The Thompson Electric Co.

381 **Fluorescent Lighting**—This 24-pp fluorescent lighting guide book is a reference digest on fluorescent products. Gives advantages of this type of lighting; summarizes various lamps and parts, including starter sockets, lampholders. Includes reference chart for lamp performance when interchanged with typical ballasts. Tabulations include seven shades of "white" lamps. Ordering details included. Sylvania Electric Products Inc.

382 **Lamp Starters**—Fluorescent lamp starters, pushbutton and automatic reset types, are described in this illustrated bulletin. Points out electrical characteristics, construction and design features, and lists special advantages. Table of insured service prices is also included. Lustra Corp. of America.

383 **Lighting Fixtures**—New Section K of Condulet Catalog 3000 describes components, performance data, and methods of relamping for any of the manufacturer's new EV series explosion-proof and weather resistant lighting fixtures. It contains illustrations showing steps for easiest relamping and installation of this type of fixture. Crouse-Hinds Co.

384 **Television Equipment** — Twenty basic applications for "TV Eye" low-cost closed circuit television equipment are described and pictured in Form 3R2335. Folder explains equipment's functions and operation, lists specifications. Radio Corp. of America.

385 **How to Use Sound Signals**—This new 44-pp combination manual, data book and catalog is an excellent reference work on industrial sound signals. Includes a simplified explanation of fundamentals of sound; a glossary

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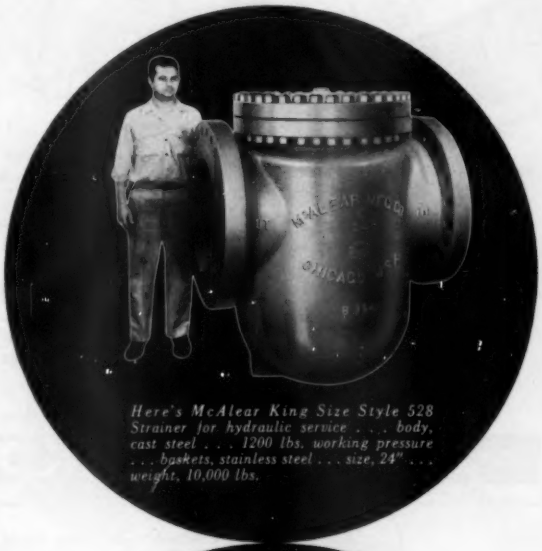

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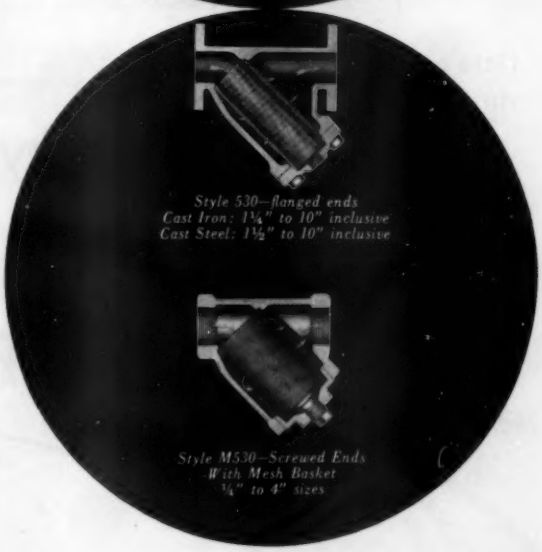

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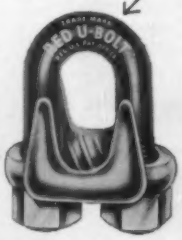

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DATA FILE

(Begins on page 204)

of sound and signal terminology; a quick-comparison guide for selecting equipment; suggested steps in choosing a signal installation, and hints for compiling a code signal call system. Benjamin Electric Mfg. Co.

386 **Standard Lighting Specifications**—A recent printing of "RLM (Reflector and Lighting Equipment Mfrs.) Standard Specifications for Industrial Lighting Units" includes new data on "upward component" lighting units such as coefficient of utilization tables, luminaire distribution data and candlepower distribution curves, plotted at "normal," "parallel" and "45 deg." This 52-pp booklet also contains latest approved revisions for specifications. RLM Standards Institute, Inc.

VIBRATION CONTROL

387 **How to Cut Vibration**—The use of Vibra-Mount felt in reducing machine vibration and accompanying noise is covered in this 20-pp illustrated booklet. Tells where this shock-absorbing felt is used effectively, how to select the proper mount, and how to install it. Cost information is provided, other felt products are listed. American Felt Co.

388 **Engineered Vibration Control**—Bulletin 104 presents spring, cork and rubber mountings, discusses advantages of each and use alone, or in combinations. Provides helpful selection chart covering a wide range of machines, showing recommended and alternate methods of isolation. The Korfund Co.

MATERIALS HANDLING

390 **Overhead Handling Equipment**—Booklet 2008-K, 12 pp, is the current edition of this company's engineering and application data booklet covering overhead materials handling equipment. Describes and illustrates track

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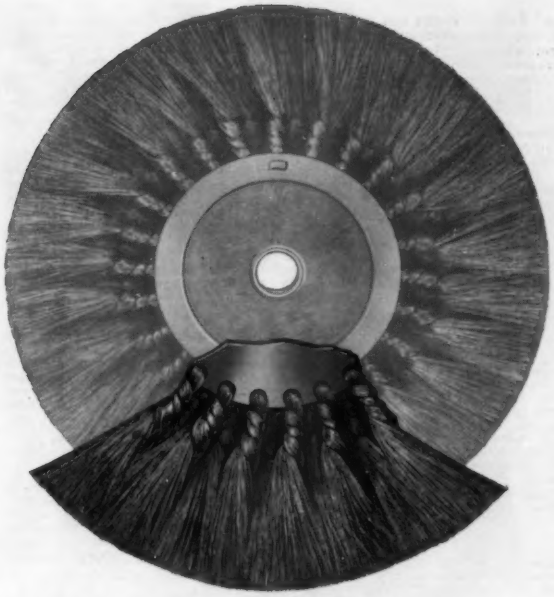

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DATA FILE

(Begins on page 204)

drives, cranes, electrification, buckets, grabs, Cleveland Tramrail Div., The Cleveland Crane & Engineering Co.

391 **Sheet Lifter** — Operational and design features of company's sheet lifting equipment, which contributes toward efficient handling, flexibility and economy are explained in Bulletin S-25, 16-pp. Cullen-Friestedt Co.

392 **Cranes for Big Jobs**—A new 1½-yard shovel, 35-ton crane is described in this 6-pp catalog. Action pictures of the machine in quarries and gravel plants are included, also specifications. American Hoist & Derrick Co.

393 **How to Choose a Crane**—Designed to aid in the selection of overhead cranes, 8-pp Unit 97 shows how to analyze handling problems, decide on the type of crane desired and draw up specifications for crane proposals. Basic data is provided on classes of crane service, crane ratings and capacities and recommended speeds for bridge, trolley and hoist, along with dimensions. Whiting Corp.

394 **Grips for Safe Handling**—Bulletin 220-B, 24 pp, pictures and gives ordering and application information on hooks, tongs, grips, and slings. Covers their use with a wide range of materials, including steel plate, pipe and round bar stock, drums and barrels, coils, cartons, baled material, timbers. Also lists wheels and guides. Downs Crane & Hoist Co.

395 **Manual on Electric Hoists** — Catalog H-46, 40 pp, covers monorail and stationary hoists and car pulleys. Explains fundamental types of grabs, methods of hanging I-beams, types of hoist suspension, controls. American Engineering Co.

396 **Electric Hoists**—Twelve-pp Bulletin DH 133B describes Speedway electric hoists of 500- to 4000-lb capacities. Fully illustrates and explains design features and gives details on suspensions and conductor systems. Clearance data, prices and specifications are included. Wright Hoist Div., American Chain & Cable Co., Inc.

397 **Electric Hoist Manual**—Catalog 215-B offers 38 pp of engineering, application and ordering information on company's Load Lifter electric hoists. Presents hoists with hand operated trolleys and with power travel, hoists with lug suspension, hook suspension and push-type trolleys, and with hand-geared trolleys, hoists for low head. Manning, Maxwell & Moore, Inc.

398 **Portable Hoists**—This bulletin describes a lightweight air hoist in 2000, 1000, 500 and 300-lb capacities. Gives specifications, dimensions. Keller Tool Co.

399 **Pneumatic Handling System**—Of value to plant engineers concerned with handling of dry pulverized materials, 16-pp Bulletin G-2 tells how handling costs can be reduced by using the proper pneumatic handling system. Lists 86 dry pulverized materials and indicates which of three systems is best suited to handle each material. Discusses company's system for conveying such materials as Portland cement, pulverized coal, limestone dust, fly ash, pulverized phosphate rock, and others. Fuller Co.

400 **Conveyor and Elevator Belting Tips**—This 32-pp manual on installation, maintenance and care of conveyor and elevator belting, uses photos and drawings to show ways to improve belt service and lengthen belt life. Includes a discussion of belt design, covers, reinforcements and grades. Repair methods, splicing, and fastenings are also covered, and there's a table listing common conveyor belt maintenance problems with their cause and remedies. The B. F. Goodrich Co.

401 **Conveyor Trolleys** — A new line of ball bearing trolleys for overhead conveyors is covered in 20-pp Book 2536. Contains specification data for the selection of new trolleys, or of replacement trolleys for existing installations. Describes many features resulting in low operating and maintenance cost, such as ball bearings with ground raceways, and machined and hardened treads. Includes application and maintenance information and a description of attachments commonly used. Twelve overhead trolley installations are illustrated. Link-Belt Co.

402 **Continuous Power Conveyor** — Sixteen-pp Catalog A-96 describes a packaged overhead conveyor for light duty applications. This complete basic "package" contains drive unit, take-up, oiler and other items essential for a 50-ft system. Describes power drive unit, track, power chain and other components and discusses lubrication and chain safeguards. Suggested layouts are diagrammed, and some installations of these conveyors are illustrated. Richards-Wilcox Mfg. Co.

403 **Engineered Conveyor Systems**—Catalog 853, 32 pp, illustrates conveyor systems in use in a wide range of industries showing how they suit handling requirements involved. Roller, wheel, belt, chain, overhead trolley and elevating conveyors are included, also spirals, portable power conveyors, ball transfers and special equipment. Mathews Conveyor Co.

404 **How to Pick a Truck**—Catalog 54, 8 pp, features a step-by-step procedure for making the best fork truck choice for a particular handling job. Other sections in the booklet show at a glance complete specifications on each of company's trucks, and illustrates important construction and design features. The Baker-Raulang Co.

405 **Shovel and Loader**—Described in 12-pp Bulletin 1932 is a hydraulic crown and hoist shovel and loader incorporating mechanical features usually associated with big shovels. Illustrates, gives specifications, application information on both pneumatic traction and crawler traction models. Dempster Bros., Inc.

406 **Shock Absorbing Casters**—Twenty-pp Catalog FH-53 describes construction features of company's Floating-Hub casters, listing types and mountings now available. Load ratings for each type and size are provided. Stresses, by text and illustration, how these shock absorbing casters work, permit smooth travel over rough floors. The Bassick Co.

407 **Freight Elevators** — Elevators designed especially for power truck loading are described in this 8-pp illustrated bulletin. Discusses various requirements for impact, off-balance, and extra static loading and shows how design and structure of company's elevators meet requirements. Otis Elevator Co.

408 **Industrial Lifts**—This booklet presents a wide range of elevating equipment designed

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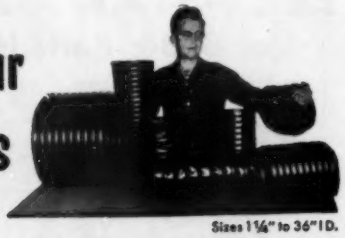

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DATA FILE

(Begins on page 204)

to step up efficiency and cut handling costs. Covers dock lifts, crossover bridges, sidewalk elevators, service lift. The Wayne Pump Co.

409 **Pickup Trucks**—Electric pickup trucks for a wide range of transportation and hauling jobs are described in an illustrated folder. Stresses their economical operation and minimum maintenance. Gives specifications of a ¼-ton model truck. Autoette.

WIRE ROPE, SLINGS

410 **Sling Handbook and Riggers Manual**—In the sling handbook section of this 48-pp book, 11 sling types are illustrated and their dimensions, weights and safe working loads given. Illustrations of sling uses accompany factual data. Also pictured and detailed are sling fittings. Information on care of slings, data on braided wire fabric and directions on splicing braided wire sling fabric included. The riggers manual gives detailed instruction on splicing, and includes data on efficiencies of wire rope attachments. Union Wire Rope Co.

411 **To Keep Wire Rope at Work**—Form 3547 is an 82-pp handbook titled: "Here's How to Keep Your Wire Rope Working," and filled with practical tips on care and use of wire rope. Tells how wire rope is constructed, what types are suited to various jobs, how to install it. Covers such subjects as abrasion, lubrication, avoiding kinks, alignment of sheaves, winding on drums, bending fatigue, wire breaks, when to discard a wire rope. Wire Rope Div., American Chain & Cable Co., Inc.

MAINTENANCE

412 **Tar Base Coatings**—Now available is a collection of five bulletins on company's 100 series of cold applied tar base coatings. One bulletin gives general information on the full line and provides an application chart. The others give detailed specifications and application information on the various types. These include a coating for protection against severest corrosive conditions; a thin high gloss coating for general maintaining purposes; a coating for protection against generally severe corrosive conditions; and one for water tank interiors. Pittsburgh Coke & Chemical Co.

413 **Hot-Dip Galvanizing**—How hot-dip galvanizing is prolonging life of industrial equipment is stressed in this 16-pp booklet. Photos showing galvanized equipment in use accompany brief text explaining how this process of covering iron and steel with a protective coating of zinc serves to prevent rust. The galvanizing procedure is explained and illustrated. Coating comparison charts show how hot-dip galvanizing compares with other types of coatings as to rust resistance, dimension limits, shock resistance, initial and maintenance costs. American Hot-Dip Galvanizers Assn., Inc.

414 **Guide to Rust Prevention**—The 24-pp 1954 edition of this company's general catalog provides a treatise on rust prevention. Features 94 color chips of manufacturer's products and includes instructions for surface preparation and application of primers, short- and long-oil types, machinery and implement finishes, chemical and heat resistant types, sealers, oil field finishes, thinning oils and floor and masonry coatings. Presents a restful color group of finishes for interiors. Rust-Oleum Corp.

415 **Painting with Aluminum**—Again made available to plant engineers is Form AD-228, 322 pp, on the use of aluminum paint. Discusses advantages of aluminum paints, describes three basic types for non-absorbent surfaces, for weather-exposed wood, and for heated surfaces and those not exposed to weather. Typical maintenance applications are covered in text and picture and practical suggestions for good results included. Use of aluminum paint on steel, galvanized metal, wood, masonry is detailed. Aluminum Company of America.

416 **Protection Against Rust**—This bulletin describes and gives application data for Z.R.C., a coating applied to iron and steel to provide a dried film protective coating of 93 to 95 per cent pure zinc. The Sealube Co.

417 **Building Maintenance — Handbook 7** offers 64 pp of information on floor surfacing, leak stoppers, external wall sealants, road-patching, roofing materials. Includes instruction for use. Flexrock Co.

418 **Proper Care of Floors** — Filled with what-to-use and how-to-use-it information, this 32-pp booklet is a well written, practical text on floors. Presents floor preservation as a triple process involving cleaning, sealing and maintaining. Discusses various floor surfaces and their special problems. Gives helpful hints on floor maintenance and provides a handy chart covering preparation procedures and products for 12 common floor surfaces including cement, wood. West Disinfecting Co.

419 **For Fast Floor Repairing**—This illustrated bulletin covers Kwik-Roc, a fast and tough hardening material for repairing holes and cracks in concrete floors. Tells how to prepare surfaces for Kwik-Roc, how to mix, place, and store it. Includes service recommendations. A. C. Horn Co., Inc.

420 **Combination Scrubber-Vacuum** — A single unit that applies the cleanser, scrubs, and picks up—all in one operation—is described in this illustrated literature. Gives full specifications for company's Model 213P for large area floors, and gives various methods of combination-machine-scrubbing suggested for hard, soft, oily floors. Also covers units for smaller and larger operations in gasoline-powered as well as electric models. Finnell System, Inc.

421 **Vacuum Cleaning Equipment**—Vacuum cleaning units to suit requirements for commercial buildings, industrial plants and buildings where noise is objectionable are listed in illustrated Bulletin 152. Also shown are furnace cleaners, units for emptying sump tanks, and special units. The Spencer Turbine Co.

422 **Light Scaffolds**—This series of illustrated bulletins describes company's line of aluminum alloy Up-right scaffolds and accessories. Pictures one-piece sections and multi-section models with various ranges of adjustability. Points out such features as locking

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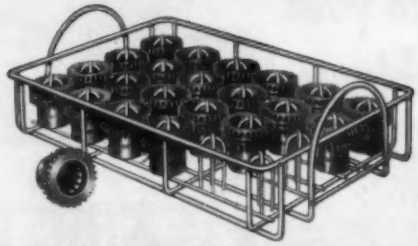

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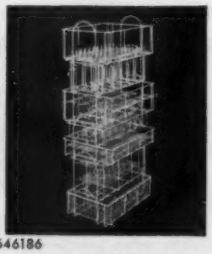

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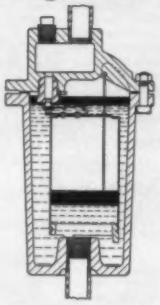

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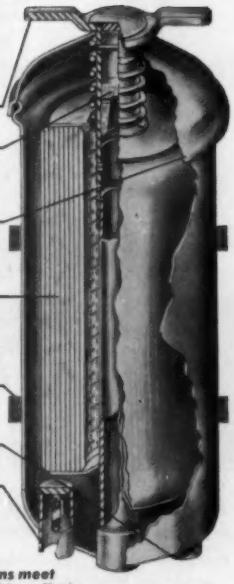

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DATA FILE

(Begins on page 204)

hooks which provide automatic security and locking casters for safety on stairways and inclines. Up-Right Scaffolds Div., Up-Right, Inc.

423 **Air Tools, Paving Breakers**—These two bulletins describe company's latest models of paving breakers and air tools for plant construction and maintenance work. Bulletin PB1 gives features and specifications on heavy-duty, medium-weight and lightweight paving breakers, as well as tools for use with them. Bulletin ST-100 describes and gives specifications for clay spaders, trench diggers and backfill tampers. Gardner-Denver Co.

CONSTRUCTION

425 **Translucent Structural Panels**—Bulletin 533, 12 pp, describes Resolite, a translucent structural material, corrugated or flat, molded of thermosetting polyester resins reinforced with woven glass fibers. Illustrates use of Resolite in partitioning, skylighting and decorating installations. Provides standard sheet specifications, general information on colors, weights, light transmission, thicknesses. Resolite Corp.

426 **How to Glaze with Plexiglas**—Sixteen-pp Booklet PL-23 gives detailed information on glazing industrial and other buildings with flat panels of the acrylic plastic Plexiglas. Written for plant engineers concerned with frequent breakage of windows or other glazing problems. Gives properties and behavior of this sheet. Plastic Dept., Rohm & Haas Co.

427 **Glass Block Fenestration**—The natural ventilation characteristics of glass block fenestration are presented in this illustrated report of a test project. In some 88 pp, report covers sun hoods, window types, dual outlets, air speeds, double loaded ventilation below window sill. Test data is summarized and recommendations included. Although test was conducted on glass block fenestration in school buildings, the information will be of interest to those concerned with industrial applications of glass block. Kimble Glass Co.

428 **Heat Absorbing Glass**—This 16-pp catalog describes Coolite, a glass designed to trap and absorb much of the sun's heat and to filter out annoying glare. Discusses types and thicknesses, gives light transmission data. Pictures many industrial installations and shows how conditioned natural illumination helps reduce operating costs. Mississippi Glass Co.

To order these catalogs circle item numbers on the handy Reader Service Cards provided on pages 199-200.

429 **Basic Roofing Information**—"What You Should Know About Your Roof" is a 40-pp clearly illustrated booklet which tells what makes a roof fail, how to recognize signs of roof deterioration, what to do to keep a roof in good condition. Discusses recommended roofing practices, essentials of a good re-roofing job. Johns-Manville.

430 **Non-Slip Flooring**—Algrip, an abrasive rolled steel floor plate described as non-slip even on steep inclines, is the subject of Booklet A-5, 8 pp. Discusses safety features; gives fabricating data. Alan Wood Steel Co.

431 **Hard Mastic Flooring**—Facts on Permaflex, a mineral and chemical floor compound, are given in this illustrated folder. Lists advantages, and tells performance characteristics of the floor, where it should be used and how it is used. Permaflex Products Co.

HOSE, ACCESSORIES

432 **Hose and Tubing**—Catalog CC-400 is a 16-pp illustrated quick-reference booklet on manufacturer's flexible metal hose and tubing. These products are made in two basic types: seamless and strip wound. Catalog shows wide range of available alloys and sizes, suggested uses; gives data. The American Brass Co.

433 **Accessories for Hose, Duct**—Accessories facilitating installation of company's hose and duct are described in illustrated Bulletin 41. Shows use of screw couplings, soft-end cuffs, and flanges for assembling hose in long lengths, attaching it to pipe of varying sizes, connecting to outlets of different shapes, and applying to equipment. The Flexaust Co.

434 **Improved Hose Coupling** — A quick connect-disconnect hose coupling for water, oil, steam, gas and chemical lines is described in this 16-pp bulletin. Describes the coupling's construction and explains how it provides a sealing action which makes the coupling tighter as internal pressure increases, and a full swiveling action. Titeflex, Inc.

TOOLS, WELDING AND MACHINE SHOP EQUIPMENT

435 **Where to Use Your Stud Driver** — Twenty-pp pocket-size Form 955 describes and pictures applications of studs, using company's Model 450 stud driver. Provides some operating hints and saftey precautions and covers use of studs through steel into concrete, wood into concrete, wood into steel and steel into steel, as well as their use for attachment of pre-drilled fixtures. Remington Arms Co., Inc.

436 **Data for the Shop**—"Fluids and Facts for Metal Working," is a pocket-size booklet of about 44 pp. A section on metal working fluids covers their function and selection, preparation and use of soluble oils and paste compounds, and prevention of dermatitis. A section on metal working facts gives conversion tables, steel numbering systems, machinability ratings of metals, drill grinding charts, twist drill sizes and other data. Booklet also includes product data on industrial oils, machine tool lubricants, greases, quenching and tempering oils. Standard Oil Co. (Ind.)

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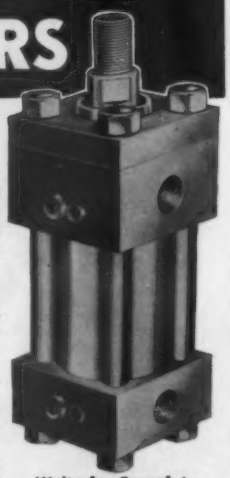

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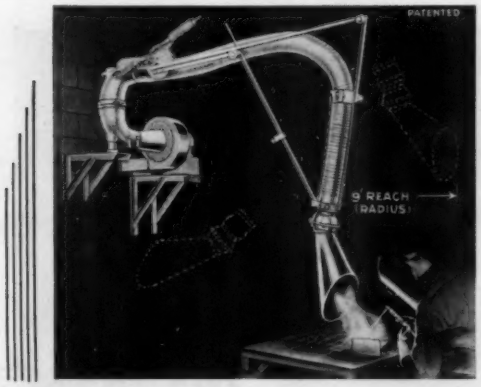

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DATA FILE

(Begins on page 204)

437 **Improved Quenching Oil**—A new quenching oil with thermal stability and high boiling range, particularly suitable for quenching systems requiring a high flash-point, is described in Form A-3073. Discusses advantages and gives specifications. Sun Oil Co.

438 **Resistance Welding** — Featured in this 24-pp catalog are newly-designed tips and holders recently added to company's equipment. Full information is also given about other holders, tips, seam welder wheels and shafts and bushings, in manufacturer's line, as well as flash, butt, barrel and other welding dies. Ampco Metal, Inc.

439 **Welding Positioners** — Fully illustrated, 16-pp Bulletin P1-2 outlines important features and gives condensed specifications on four welding positioners with capacities to 35,000 lb. An efficiency graph based on typical welding jobs provides a quick picture of production advantage. Welding Div., Harnischfeger Corp.

440 **Flux Recovery Equipment**—How company's flux recovery equipment salvages valuable flux, saves man-hours, and speeds and improves welding is told in this 6-pp illustrated bulletin. Describes primary recovery installations. Invincible Vacuum Cleaner and Mfg. Co.

441 **Pipe Tool Ordering Guide** — Catalog 2-51, 8 pp, covers company's line of threaders, cutters, vises, dies, tongs and wrenches; gives prices. Armstrong Bros. Tool Co.

LUBRICANTS, LUBRICATION

442 **Bearing Lubrication**—Vol. XL, No. 10 of this company's Lubrication magazine provides an excellent 12-pp article on industrial bearing lubrication. Illustrated with photos and drawings, text covers such subjects as bearing design; bearing surfaces; bearing overhaul; aspects of lubrication, including factors involved in choice of turbine oils and diesel lubricants, and the effects of moisture; and the life expectancy of bearing lubricants. The special requirements of porous bearings are also discussed. The Texas Co.

443 **Automatic Lubrication** — Sixteen-pp Catalog L-52 describes force feed lubricators for all types of machinery. Illustrated, gives full design and construction details on company's open and enclosed type lubricators, available in capacities from 2 to 32 units with 1 to 24 feeds per unit. Hills-McCanna Co.

444 **Force Feed Lubricators**—12-pp Catalog 25 G describes and pictures company's new Model 25 lubricator, a popular priced, general purpose unit adaptable to many applications. Lists machines for which it provides economical, automatic lubrication. Discusses drive arrangements. Manzel Div., Frontier Industries, Inc.

445 **Centralized Lubrication** — Pocket-sized 24-pp, Form 34-22, called "Ask Anyone in Industry" describes in comic-book form the hazards and inefficiency inherent in conventional lubrication practice and promotes use of centralized lubrication—in the form of Alemite Accumeter measuring fittings. Shows how these are connected by tubing to a lubrication pump controlled by an automatic timer. Alemite Div., Stewart-Warner Corp.

446 **Multi-Purpose Grease**—This bulletin describes Gargoyle Grease BRB No. 1, intended to provide correct lubrication for practically all normally loaded anti-friction and plain bearings. Tells how it resists leakage, protects against rust and corrosion. Socony-Vacuum Oil Co.

447 **Spray Lube System**—This 8-pp illustrated bulletin describes company's method of single and multi-point application of liquids to a wide range of metal cutting and forming operations. Tells how it works and records results of various tests, as well as pointing out advantages. C. A. Norgren Co.

WATER CONDITIONING

449 **Information on Ion Exchangers**—Here are three booklets on ion exchangers; Nalcite HCR, a styrene type cation exchanger; Nalcite SAR, a basic anion type; and Super Nalcolite, a synthetic gel type zeolite for cation exchange. Tables and graphs explain performance of these water treating resins under various operating conditions. Physical characteristics, exchange capacities, regeneration techniques given. National Aluminate Corp.

450 **Testing Equipment**—Designed for use as a guide in the selection of water testing equipment, this 12-pp bulletin describes complete line of titration stands and test sets for hardness, alkalinity, chloride, sulfide, etc.; cabinets and test set for similar tests; Conducto Bridge for determination of specific conductance of water solutions. colorimetric comparators: and photometer. W. H. & L. D. Betz.

BOILERS, GENERATORS

453 **Automatic Boilers** — Bulletin BE-4 describes operation and advantages of Continental automatic boiler's spinning gas technique—a method of obtaining maximum heat transfer with a simplified design. Shows cutaway view of boiler construction; illustrates hinged doors and method of injecting air through static, turbine-like vanes into burner. Boiler Engineering & Supply Co., Inc.

454 **Steam Generators**—"Cyclonic combustion," a new method of heat transfer is discussed in this bulletin. Descriptive drawings show how air is introduced into combustion chamber at high speeds in revolving spiral vortex, radiating heat to fire tube through direct radiation and convection. Cyclotherm.

455 **Efficient Little Boiler**—Bulletin AD-135 describes company's CB-50-80 boilers available in 50 to 80 hp (15 to 150 lb steam, 30 lb hot water) for heating and processing. Stresses such advantages as silent operation, fuel flexibility, speed, easy maintenance, and automatic operation. Discusses new hinged doors, forced draft systems. Cleaver-Brooks Co.

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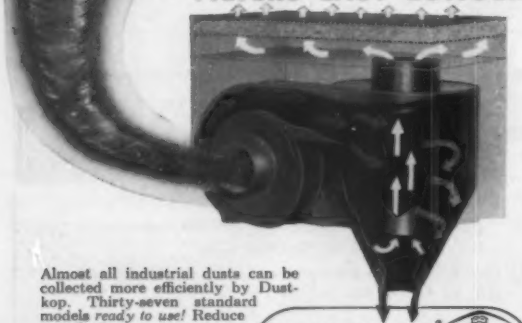

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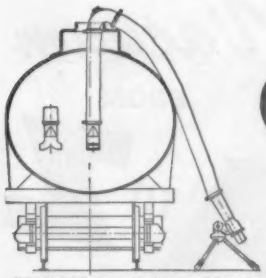

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(Begins on page 204)

OTHER EQUIPMENT

457 Air and Hydraulic Cylinders—This 12-pp pamphlet points out new economies, convenience, and versatility in the use of air and hydraulic cylinders. Highlights "standardization" of critical cylinder mounting dimensions and stroke lengths, interchangeable detachable mounting; shows how these and other advantages can be obtained for automation, other heavy duty service. Miller Fluid Power Co.

458 Rigid Plastic Material—The advantages, uses and available forms of Bolatron 6200 are presented in this catalog, about 14 pp. Gives dimensional data, tolerances, weights for sheet, bar stock, pipe, fittings and valves made of this unplasticized polyvinyl chloride. Includes thermal, electrical and mechanical properties, also detailed information on chemical resistance. H. N. Hartwell & Son, Inc.

459 Precision Threaded Fasteners — Company's line of precision threaded fasteners is described in this 32-pp illustrated catalog, which stresses savings in costs and delivery time gained by specifying and ordering standard fasteners. Includes socket screw products, socket head cap screws, self-locking set screws, shoulder screws, flat head socket cap screws and button head socket screws. Tables list specifications. Standard Pressed Steel Co.

460 Steel Reservoirs, Standpipes — This 24-pp booklet pictures installation of reservoirs of 50,000- to 10,000,000-gal capacity, having cone, umbrella or ellipsoidal roofs and ornamental structures with special architectural features. Provides table of standard capacities, information on foundations, use of suction tanks for fire protection. Chicago Bridge & Iron Co.

461 Neoprene Design Book—This illustrated bulletin discusses the properties of Neoprene, showing how they are utilized in products made from this chemical rubber. Covers its toughness, hardness range, air retention, performance under load, at extreme temperatures, flame and chemical resistance. Rubber Chemicals Div., E. I. du Pont de Nemours & Co.

462 Magnetic Selection Guide — Twelve-pp illustrated Catalog C-5000-B, describing manufacturer's entire line of magnetic separators and lighting magnets, serves as handy guide to the selection of magnets. Dings Magnetic Separator Co.

463 Door Operators—This catalog covers electronic operators for opening, closing and locking doors and gates for a wide range of applications. Robot-Appliances, Inc.

464 Industrial Non-Metallics — Polypenco Nylon, Teflon, filled nylons, and other non-metallics are the subjects of this bulletin. Illustrated with photos, gives characteristics and advantages of these materials, data on rod, strip, tubing and slab available, parts that can be produced. Polymer Corp. of Pennsylvania.

465 Finishing Systems—Illustrated Catalog A-653, 12 pp, describes complete finishing systems for porcelain and synthetic enamel, lacquer, paint, and other finishing. Also covers a variety of other industrial equipment including ovens, dust collectors. The R. C. Mahon Co.

466 Self-Lubricating Bushings — Eight-pp Bulletin Form 112 discusses company's Graphalloy bushings, designed for strength and high heat dissipating qualities. Also discusses such advantages as durability, no fumes, low and high temperature operation, fire preventive and low coefficient of expansion. Presents engineering data. Graphite Metallizing Corp.

467 Industrial Fans — Propellair Bulletin 650, 12 pp, contains dimensions, application, and performance data of Tubeaxial and Stackbooster fans. Gives information on cooling and driving problems, system and open surface tank ventilation. Robbins & Myers, Inc.

468 Industrial Leathers — These illustrated data sheets cover company's leather products and include specifications on various types of leather belting. Also give data on leather packings for hydraulic and pneumatic equipment. J. E. Rhoads & Sons.

469 Preheating Combustion Air—This well-illustrated 36-pp booklet explains fuel savings and increased performance made possible by using waste heat in flue gases to preheat incoming combustion air. Also covers increased boiler output, ability to use lower grade fuels. Air Preheater Corp.

470 Industrial Ovens — Engineering, manufacturing and installation of processing ovens are described in Bulletin D-53-20, 16 pp. Covers oven types, application to industry, source of heat, selection of heaters, control of heat, distribution of heat. Photos show typical oven installations, and a complete modern finishing process is presented. Newcomb-Detroit Co.

471 Industrial Dry Coolers—Illustrated Bulletin DC-50, 12 pp, presents dry cooling equipment for small, "in-between," and heavy-duty cooling jobs and includes three recent models. Two are small "portable" units and the third a medium size unit. The Marley Co., Inc.

472 Steam Accumulator — How the steam supply and demand can be balanced by means of company's steam accumulator is told in Bulletin RA-52-8. Stresses reduced boiler capacity required and increased boiler efficiency afforded by use of the accumulator, other advantages. Foster Wheeler Corp.

473 Combination Burners—Bulletin 176 describes and illustrates fully automatic oil-gas burners of the horizontal rotary-nozzle mix type designed to permit instant change from one fuel to another. Gives design details and electrical characteristics, includes specifications. Also presents an extension front for conversion installation. Preferred Utilities Mfg. Co.

474 Power Plant Equipment—This comprehensive folder illustrates some of the equipment and services provided by this company. Shows heat exchangers, filters, condensers; also such services as re-tubing and metal spraying. Condenser Service & Engineering Co., Inc.

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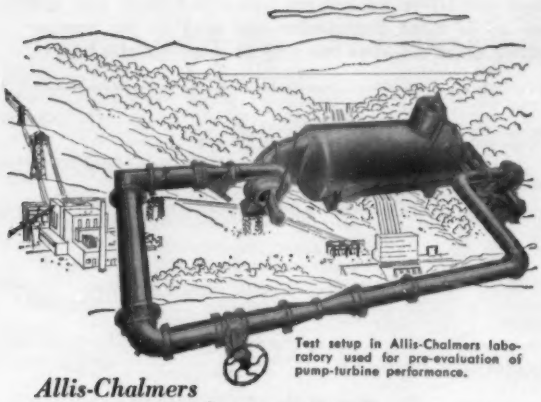

Test setup in Allis-Chalmers laboratory used for pre-evaluation of pump-turbine performance.

Allis-Chalmers
uses **AMPCO* METAL** *to combat wear*

New reversible pump-turbine has Ampco metal at a critical point — to assure continuous high efficiency with minimum maintenance

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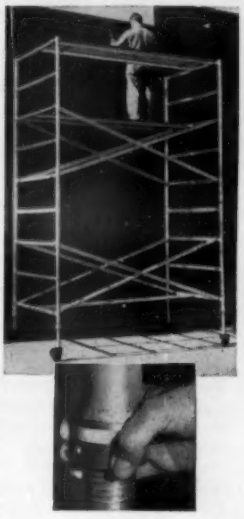
NEW 4'6"-WIDE LADDER SCAFFOLD



This 4'6"-wide aluminum ladder scaffold provides added stability and extra working room for painting, cleaning, relamping and general maintenance jobs. Lightweight, aluminum components are easy to erect. Base section is 6' high. Other heights are achieved by combining other ladder units of 4' and 5'4", and using 24" leg adjustment (Inset). Leg adjustment (on all three Scaffolds) is built in and gives safe, positive height adjustment without lifting scaffold. Diagonal braces give 6', 8' or 10' spans. Smooth-rolling rubber-tired casters. Use inquiry card or write The Patent Scaffolding Co., Inc., 38-21 12th St., Long Island City 1, N. Y., Dept. PE.

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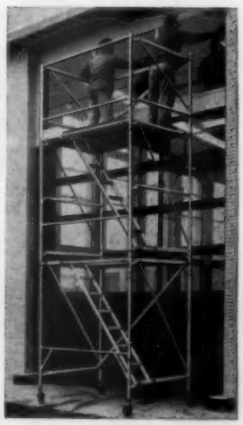

One man can erect the base section of the "Fold-A-Way"* scaffold in less than a minute. End frames swing open sideways, while the base section is in a standing position, making an easily managed swing of about 90°. Adding additional 6' sections takes just a few minutes. Basic unit is 4'6" x 6' and is 7' high including rubber-tired casters. Ball bearing extension legs permit height adjustment up to 24". Approved by Underwriters Laboratories, Inc. For more information on the "Fold-A-Way" Scaffold use inquiry card or write The Patent Scaffolding Co., Inc., 38-21 12th St., Long Island City 1, N. Y., Dept. PE.

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NEW! 'Sexauer' Monel Self-Locking bibb screw—10 sizes do the work of 37!

NEW! 'Sexauer' Easy-Tite faucet washer with Fiberglas reinforcing

This nylon plug locks the screw *automatically!*

NEW! Amazing, patented screw and washer combination cuts faucet washer replacements 75%

—with each leak eliminated, you reduce water and fuel bills up to $28.80 quarterly

Most faucet washer failures are caused by wrong length screws. 'Sexauer' Self-Locking screws* and Easy-Tite washers*—used together—cut costly washer replacements 75%! You save up to $28.80 quarterly in water and fuel alone with each leak stopped. Here's how . . .

A screw *too short* for the tapping distorts and splits the washer when tightened; the washer works loose, is torn to shreds. If *too long*, it can't grip the washer; this ruins the washer and causes hammering in the water line.

Simplifies fitting problem—cuts installation costs

'Sexauer' Self-Locking screws eliminate the problem of misfit screws. They lock *automatically* at the required depth as the nylon plug is compressed in the faucet thread. The washer is not distorted, is held firmly.

You can re-use Self-Locking bibb screws repeatedly. Made of Monel, they resist corrosion, never rust; heads won't twist off, screw driver will not distort the slot.

Self-Locking screws save time spent in fitting the proper length—10 sizes do the work of 37! Used with new, Fiberglas-reinforced 'Sexauer' Easy-Tites, they cut washer replacements 75%, fixtures last longer. Easy-Tites resist closing squeeze and excessively hot water, outlast ordinary washers 6 to 1!

Water and fuel savings

One dripping faucet wastes 8,000 gals. of water yearly. A pinhole size stream increases waste to 8,000 gals. in a *single month!* Here is what you save *quarterly* in stopping just *one* pinhole leak on a hot water faucet:

Fuel Saving		Water Saving	Total Saving
Oil (198 gals.)	$22.77	$6.03	$28.80
Coal (2,469 lbs.)	22.22	6.03	28.25
Gas (21,103 cu. ft.)	21.20	6.03	27.23

Save water, fuel and labor costs; conserve costly fixtures by cutting washer replacements 75%! Use *new* 'Sexauer' Self-Locking screws and Easy-Tite faucet washers. *You save every time you do!*

WRITE FOR CATALOG. New 'Sexauer' Self-Locking screws and Easy-Tite washers are just part of the line of over 3,000 'Sexauer' Triple-Wear plumbing repair parts and patented precision tools. Send for our new, 126-page Catalog H. *Write today!*

*Reg. U. S. Pat. Off.

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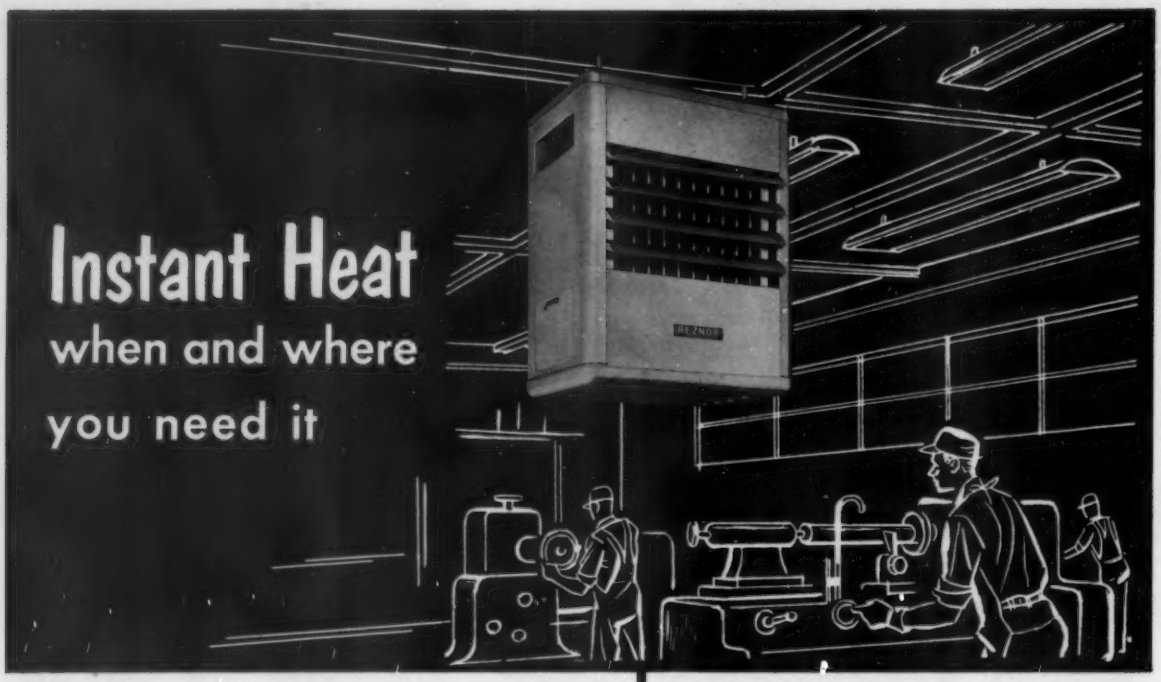

Reznor gas-fired unit heaters respond instantly, automatically to the requirements of their immediate surroundings. Each acts independently, producing and distributing heat only as it is needed nearby. That's why Reznor heaters are the economical way to heat your plant or warehouse.

Because Reznor heat is on-the-spot heat, there's no transmission loss, no need to maintain the constant stand-by firing required by any central heating system. And you don't have to waste heat on areas which aren't being used. Fuel costs are bound to be lower.

Once the thermostat is set, Reznor heating is completely automatic. No fires to tend, no ashes to remove, no complicated equipment to maintain. Labor costs are sure to be lower, too.

Economy and flexibility make Reznor gas-fired unit heaters the outstanding answer to the heating requirements of new industrial construction. The same advantages make them ideal for supplemental heating in older plants. In offices and other areas where above average temperatures are required, for outlying buildings beyond the range of a central heating system, and for trouble spots such as areas facing large doors, Reznor heaters are the solution.

Before you make any decisions on heating equipment, check the Reznor catalog in Sweet's Plant Engineering File. And be sure you've seen Bulletin SA-541, "Application of Gas Unit Heating." Use the coupon on this page to send for your free copy today.

This handy application guide will help you plan a successful unit heater installation

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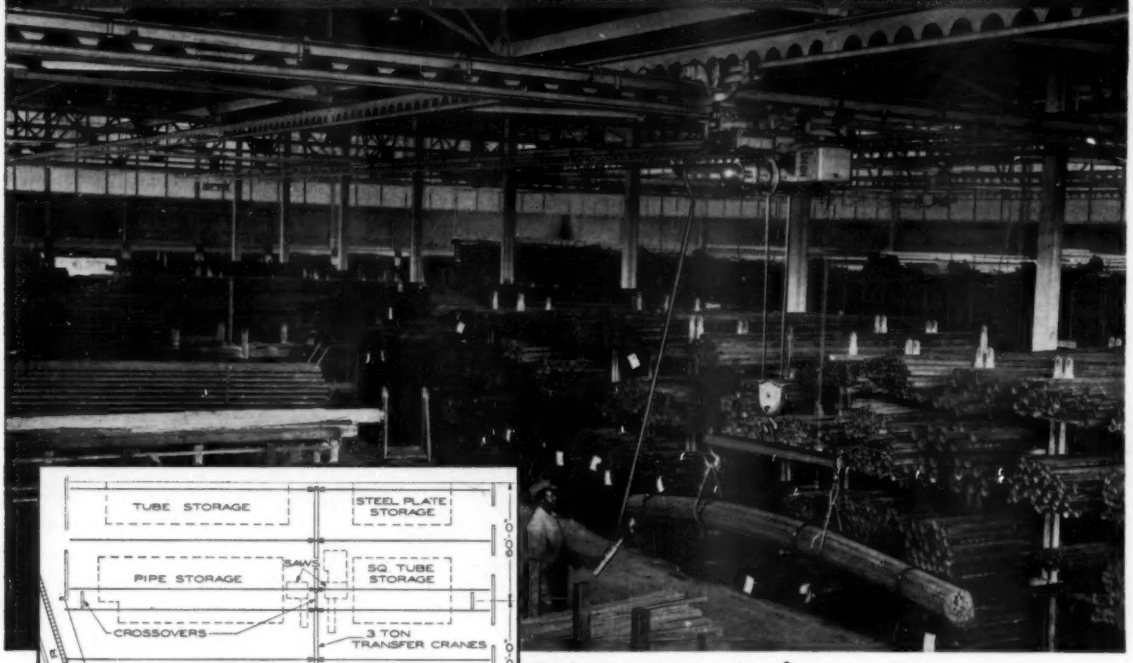

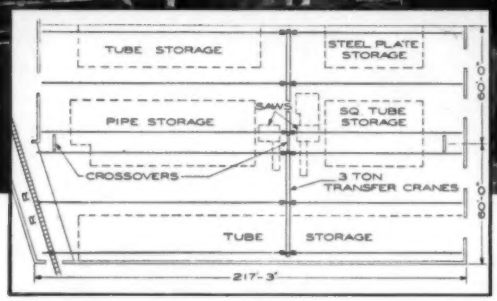

The large storage area is completely covered by Tramrail crane service. Every item can be seen from the floor and readily reached with the two transfer cranes.

▲ The Tramrail transfer cranes make it easy to place the long unwieldly pipes and bar stock into storage at any height. This makes for orderliness, which is an important factor in securing high operating efficiency.

THE BIG modern warehouse of J. M. Tull Metal & Supply Co., Atlanta, Georgia, was designed to make use of overhead Tramrail equipment to enable the handling of large unit loads in and out of storage with the least effort and in the quickest time.

The principal storage section is provided with two parallel runways each having three tracks. On both runways is a 64-foot transfer crane that travels the length of the room. Cross-overs are provided, enabling a hoist carrier transferring from one crane to the other. This makes it possible to haul materials between any two points in the entire area without rehandling.

Steel is constantly on the move in this active plant. From 60,000 to 70,000 lbs. are brought in by railroad car daily and like amounts are shipped out. The material is unloaded from railroad cars at one end of the building and placed into storage. It is shipped out on trucks which are loaded at the other end.

The overhead crane system makes it possible to place incoming materials into allotted storage spaces at once. The need of storing temporarily in aisleways or other areas and extra handling which this entails is eliminated. Thus, the warehouse is kept orderly at all times and every item is readily seen and conveniently reached. Danger of handling accidents is minimized and overall efficiency is unusually high.

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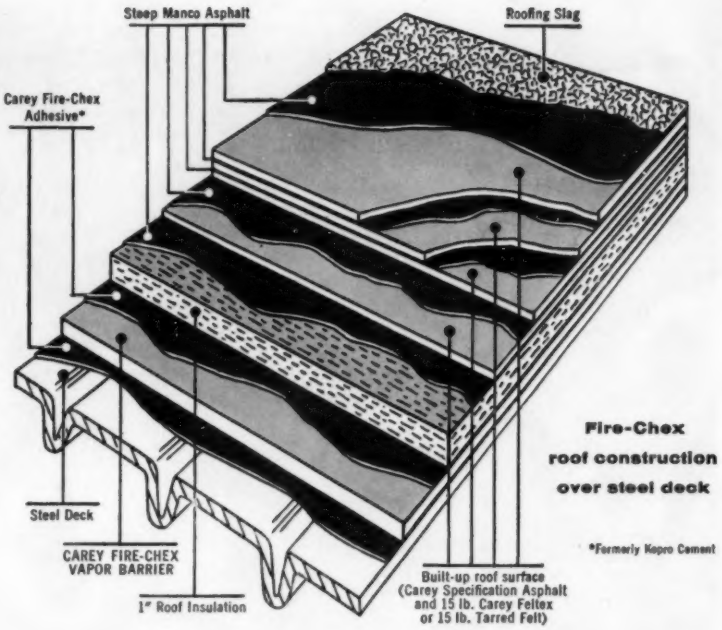
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Steel Deck
CAREY FIRE-CHEX VAPOR BARRIER
1" Roof Insulation
Built-up roof surface (Carey Specification Asphalt and 15 lb. Carey Feltex or 15 lb. Tarred Felt)

Fire-Chex roof construction over steel deck

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Carey Fire-Chex Asbestos-Plastic Vapor Barrier

Application is Easy—
Simply apply Carey Fire-Chex Adhesive* with brush or spray over entire deck. When adhesive becomes tacky . . .

Apply a full 36" wide sheet of Fire-Chex Vapor Barrier, sanded side to deck. Allow 3" side lap, 6" end lap.

Seal both ends securely with Fire-Chex Adhesive. Continue application, lapping each sheet 3". Now apply insulation and built-up roofing.

In Carey FIRE-CHEX, you have a vapor barrier that *does not contribute to fire and cause it to spread!* Even when installed over a standard steel deck that becomes red-hot in a fire, FIRE-CHEX remains intact—*does not release melting asphalt and excessive gases!* Product of over a million dollars invested in development, tests *prove* FIRE-CHEX removes all doubt about fire-safety in built-up roofing.

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Write today for a sample of this Carey dependable product, and for your copy of the FIRE-CHEX Specification Sheet. Or, request a Carey Industrial Sales Engineer to call. Address Department PE-3.

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APRIL, 1955

Plant Engineering

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